FORM PTO-1390 (REV 10/95)

U. S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

HUBR 1177

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/762006

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/05710	6 August 1999	6 August 1998

TITLE OF INVENTION

NOVEL PHOSPHOLIPIDS WITH UNSATURATED ALKYL AND ACYL CHAINS

APPLICANT(S) FOR DO/EO/US

Hansjörg EIBL and Thomas HOTTKOWITZ

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ■ This is the FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ■ This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).
4. ■ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ■ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ■ is transmitted herewith (required only if not transmitted by the International Bureau.)
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ■ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ■ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ■ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ■ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ■ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ■ Other items or information: (a) International Search Report; (b) PCT/IPEA/409; PCT/IB/306/ PCT/RO/101
17. ■ The follow fees are submitted: (a) Check for Filing Fee and (b) Assignment Fee

EXPRESS MAIL NO. EL 759723714 US MAILED FEBRUARY 1, 2001

BASIC NATIONAL FEE (37 CFR 1.492(A)(1) - (5)):

Search Report has been prepared by the EPO or JPO $860.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) $690.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ... $710.00

Neither International preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO $1000.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =				$860.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				$	
CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE	
Total claims	34	- 20 =	14	x $18.00	$252.00
Independent	2	- 3 =	0	x $80.00	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ $250.00	$
	TOTAL OF ABOVE CALCULATIONS =				$1112.00
Reduction of ½ for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).					$ 556.00
	SUBTOTAL =				$556.00
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +					$
	TOTAL NATIONAL FEE =				$556.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property+					$ 40.00
	TOTAL FEES ENCLOSED =				$596.00
				Amount to be: refunded	$
				charged	$

a. ■ A check in the amount of $ 596.00 (Filing Fee)) and Assignment fee to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. 50-0624 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ■ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 50-0624 . A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
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02/01/01

39,155
REGISTRATION NUMBER

EXPRESS MAIL NO. EL 759723714 US Mailed FEBRUARY 1, 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Eibl, et al.
International Appln. No.	:	PCT/EP99/05710
International Filing Date	:	August 6, 1999
For	:	NOVEL PHOSPHOLIPIDS WITH UNSATURATED ALKYL AND ACYL CHAINS

February 1, 2001

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231
Box PCT

PRELIMINARY AMENDMENT

SIR:

In advance of prosecution, please amend the above-identified patent application as follows:

IN THE CLAIMS

Cancel claims 31, 36-42 without prejudice.

Claim 10, lines 1-2, delete "any of the preceding claims" and substitute -- claim 1 -- .

Claim 11, line 1, delete "any of claims 1 to 9" and substitute -- claim 1 -- .

Claim 12, lines 1-2, delete "any of the preceding claims" and substitute -- claim 1 -- .

Claim 13, lines 1-2, delete "any of the preceding claims" and substitute -- claim 1 -- .

Claim 14, lines 1-2, delete "any of the preceding claims" and substitute -- claim 1 -- .

Claim 18, line 1, delete "any of claims 1 to 13" and substitute -- claim 1 -- .

Claim 20, line 1, delete "or 19".

Claim 21, line 1, delete "or 19".

Claim 22, line 1, delete "or 19".

Claim 23, line 1, delete "any of claims 18 to 22" and substitute -- claim 18 -- .

Claim 24, line 1, delete "any of claims 18 to 22" and substitute -- claim 18 -- .

Claim 25, line 1, delete " 19, 21 or 23".

Claim 26, line 1, delete "19, 21 or 24".

Claim 27, line 1, delete "or 19".

Claim 28, line 1, delete "or 19".

Claim 29, lines 4-5, delete "any of claims 1, 18 to 26" and substitute -- claim 1 -- .

Claim 32, line 1, delete "any of claims 29 to 31" and substitute -- claim 29 -- .

Claim 33, lines 2-3, delete "any of claims 1, 14 to 17 and 27 to 29" and substitute -- claim 1 -- .

REMARKS

Please enter this amendment prior to examination on the merits.

It is not believed that any fees are due at this time, but any necessary fees may be charged to deposit account no. 50-0624.

Respectfully submitted,

FULBRIGHT & JAWORSKI L.L.P.

By _____
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Reg. No. 39,155

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PHOSPHOLIPIDS WITH UNSATURATED ALKYL AND ACYL CHAINS

Description

The invention relates to phospholipid-like compounds of the formula (I) with defined apolar constituents, and to a process for the preparation thereof. The invention additionally relates to the use of the phospholipid-like compounds as liposomes, active ingredients and solubilizers.

Phospholipid-type compounds have many possible uses, for example as liposome constituents for transporting drugs or as gene transport vehicles, as solubilizers for drugs of low solubility in water, and themselves as active ingredients against diseases such as, for example, cancer or leishmaniosis.

Phospholipid-like compounds of this type consist of a polar and an apolar moiety. Glycerophospholipids comprise as essential constituent glycerol which is esterified in the sn-1 and sn-2 positions mainly with fatty acids (apolar moiety). If at least one of the two OH groups on the glycerol structure is etherified with an alcohol, the term used is ether phospholipids. The polarity of the compounds of the invention derives from the negatively charged phosphate group and from the esterified alcohol component, which contains a quaternary, positively charged nitrogen. This group may be present one or more times or else not present at all, resulting in each case in a negative or positive excess charge or else no charge.

The apolar portion is formed by alkyl or acyl chains, which may be in saturated or unsaturated form. The possible variations in the synthesis of the apolar region has to date been limited to the naturally occurring acyl radicals or alkyl chains. It is possible

by specific modifications of the apolar region to change markedly and control specifically the physical, biochemical and biological properties of the phospholipid compounds.

Liposomes as transport vehicles or drug carriers are known. The frequently used phosphatidylcholines such as 1,2-dipalmitoyl-*sn*-glycero-3-phosphocholine (DPPC), 1,2-distearoyl-*sn*-glycero-3-phosphocholine (DSPC) or 1,2-dioleyl-*sn*-glycero-3-phosphocholine (DOPC) form on sonication with cholesterol in the ratio 60:40 liposomes of the order of 60 nm in size. However, it may often be advantageous to produce liposomes with a larger internal volume, because larger amounts of active ingredients can be transported therewith. However, the problem with this is that to produce liposomes with a diameter of more than 100 nm in size it is necessary to use processing techniques such as, for example, extrusion, which is associated with distinct disadvantages, for example due to the brittleness of the polycarbonate membrane or blockage of the pores. This makes it difficult in particular to prepare relatively large batches for pharmaceutical purposes. It is possible by extending the alkyl or acyl chains of the apolar moiety to achieve, because of steric factors, an arrangement of the molecules with less curvature on formation of vesicles. The result is the formation of larger liposomes, which can be achieved by ultrasound treatment without extrusion processes. In order to keep the phase transition temperature of phospholipids with extremely long fatty acids (with more than 22 C atoms) in a range which is favorable for liposome formation, fatty acids with a cis double bond located as near the middle as possible are used. Such extremely long-chain fatty acids occur in only small amounts in nature.

Phospholipid compounds can also be employed directly as active pharmaceutical ingredients. The antineoplastic and immunomodulatory effect of lysolecithins (which have only one instead of two fatty acids on the glycerol) and ether lysolecithins in cell culture experiments has been known for more than 30 years. The basic precondition for antineoplastic activity of lysophospholipids and analogs is accumulation in the diseased tissue. Lysophosphatidylcholines are readily metabolized by phospholipases or acryltransferases and are no longer available to the body, whereas ether lysolecithins can be detoxified by oxidative cleavage of the ether linkage or acylation of the *sn*-2 position. This is why substances which are less good substrates for phospholipid-metabolizing enzymes but still have a lysolecithin-like structure have been synthesized. The first phosphocholine with antitumor activity found was the ether lipid 1-O-octadecyl-2-O-methyl-rac-glycero-3-phosphocholine (ET18-OCH_3 also known as edelfosine). ET18-OCH_3 shows excellent antineoplastic activity in cell-culture experiments but proved to be virtually inactive in complex organisms.

Dispensing with glycerol as basis of the structure results in the metabolically more stable alkylphosphocholines (APC), substances which accumulate in membranes and have a marked effect in cell properties. Alkylphosphocholines do not occur in nature and are phosphocholine esters of long-chain alcohols which, because of their simplified structure, now have substrate properties only for phospholipase D. The best known representative to date of this class of substances is hexadecylphosphocholine (HePC), an alkylphosphocholine which was approved as medicine in 1992 under the name Miltex® (active ingredient: miltefosine) and has therefore also been intensively investigated. HePC is employed for the topical treatment of breast cancers and lymphomas with cutaneous metastases.

Alkylphosphocholines not only reduce tumors but also activate cytotoxic macrophages and inhibit the invasion of healthy tissue by neoplastic cells. Recent investigations have shown that APCs (and especially HePC) are potent active ingredients for controlling leishmaniosis and trypanosomiasis. Direct intravenous administration of an HePC solution causes thrombophlebitis in rats. In clinical studies, HePC shows toxicities in the gastrointestinal tract on oral administration and therefore cannot be administered in effective concentrations. One exception is HePC for controlling leishmaniosis: HePC acts in doses so low that the side effects described above do not occur.

The first intravenously injectable alkylphosphocholine to be found was erucylphosphocholine (ErPC), a phosphocholine with a C_{22}-alkyl chain and cis double bond in the ω-9-position. It has emerged that structural variations in the apolar region of unsaturated and thus intravenously administrable alkylphosphocholines, for example on shifting the double bond to the ω-12 or ω-6 position, lead to improved antitumor activity compared with erucylphosphocholine, the most effective compound to date (see table 2 in example 5).

Phospholipids are also used as solubilizers for drugs of low solubility in water. Once again, these solubilizing properties can be improved by modifying the apolar region.

To date it has been possible to modify specifically only the polar moiety in the synthesis of phospholipids of the abovementioned classes. It has to date been possible to use for the apolar portion only commercially available fatty acids and naturally occurring fatty acids.

Phospholipids occurring in nature and specifically in mammals mainly comprise unbranched fatty acids with 8 to 24 C atoms which, owing to their biosynthesis, have almost exclusively an even number of carbon atoms. Unsaturated fatty acids usually have 1 to 4 double bonds, mainly in the cis configuration. Naturally occurring monounsaturated fatty acids usually have the double bond in the middle, i.e. in palmitoleic acid it is located at the ω-7 position or at the (Z)-9 position in the preferred notation used in the examples herein. The higher fatty acids oleic, eicosenoic, erucic and nervonic acid each have the double bond at the ω-9 position in the carbon chain or, correspondingly, at the (Z)-9, (Z)-11, (Z)-13 and (Z)-15 position in the notation preferred herein.

In polyunsaturated fatty acids, the positions of the unsaturations are such that in each case there is only one CH_2 group between them. This is important for making the autoxidation of the fatty acids possible. However, it would be advantageous, precisely on use of phospholipids as drugs or liposomes, to prevent the autoxidation in order to obtain more stable compounds. This can be achieved only by compounds in which the unsaturations in the alkyl and acyl chains are more than one methylene group apart.

German patent application DE 197 35 776.8 discloses phospholipid-analogous compounds as liposome constituents, active pharmaceutical ingredients or solubilizers, which contain saturated or monounsaturated acyl or alkyl radicals, with the total of the carbon atoms in the acyl and alkyl being between 16 and 44.

It was therefore an object of the present invention to provide compounds which, owing to modifications in the apolar region, have improved properties for the

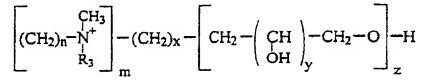
aforementioned applications and, in addition, can be prepared on an industrial scale. It was a further object of the present invention to make it possible, by a novel process, to prepare unsaturated fatty acids in which the double bonds are at positions which do not occur in naturally occurring mono- and diunsaturated fatty acids, or to provide a process which makes it possible to prepare monounsaturated fatty acids which are difficult to obtain, for example nervonic acid, in industrial quantities.

This object is achieved according to the invention by a compound of the general formula (I)

(I) $A - PO_3^- - B$

in which B is a radical of the general formula (II)

(II)



in which

n is an integer from 2 to 8;

m is 0, 1 or 2;

x is an integer from 0 to 8;

y is an integer from 1 to 4;

z is an integer from 0 to 5;

R_3 is an alkyl radical having 1 to 3 C atoms, which may be substituted by one or more hydroxyl groups;

and in which A is a radical selected from one of the formulae (III) to (IX):

(III) 

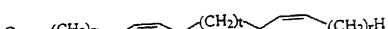
(IV) 

(V) 

(VI) 

(VII) 

(VIII) 

(IX) 

in which

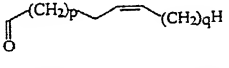
g is an integer from 0 to 8;

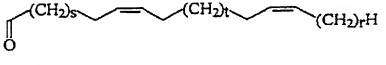
p, q, r, s, t ≥ 0;

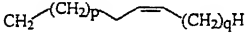
12 ≤ p + q ≤ 30 and

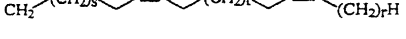
8 ≤ s + t + r ≤ 26;

where R_1 and R_2 are each independently hydrogen, a saturated or unsaturated acyl or alkyl radical or a radical selected from one of the formulae (X), (XI), (XII) and (XIII), and at least one of R_1 and R_2 is a radical selected from one of the formulae (X), (XI), (XII) and (XIII):

(X) 

(XI) 

(XII) 

(XIII) 

where q ≠ 8 for p + q = 14, 16, 18 or 20, if neither of the radicals R_1 and R_2 is a radical of the formula (XI) or (XIII), or if A is a radical of the formula (VIII).

The structural elements used in the substances described herein can be varied as desired and tailored to suit the particular use. Particularly preferred monounsaturated acyl and alkyl radicals are those whose double bond is not in a natural position. Compounds in which both the radicals R_1 and R_2 are naturally occurring monounsaturated acyl or alkyl chains, such as, for example, those having the C=C bond in the ω-9 position, thus do not form part of the invention. The process of the invention makes it possible to choose the position of the double bond(s) without restriction, so that previously inaccessible alkyl/acyl chains can be prepared. As already explained above, the cis double bonds of natural diunsaturated alkyl and acyl chains are in each case separated by only one methylene group. Such compounds are unstable at room temperature in the presence of oxygen and must therefore be stored at low temperatures under nitrogen. The possibility of synthesizing (Z)-fatty acids and (Z)-alkenols with the alkyl or acyl chains of the formulae (IX), (XI) and (XIII) having 16 to 34 C atoms allows structural elements in which there are at least 2 methylene groups between the unsaturations to be provided. This results in a considerable stabilization of the fatty acids and alcohols and of the classes of compounds synthesized therefrom. Compounds of the invention can be stored without difficulty at room temperature without inert gas. The term (Z)-fatty acids or -alkenols as used herein encompasses both mono- and diunsaturated chains with one or two cis double bonds.

The advantage of the particularly preferred alkyl and acyl chains with two double bonds is that the physicochemical properties are favorable. Thus, for

example, the diunsaturated fatty acids (Z,Z)-10,19-octacosadienoic acid, which is based on a 28 carbon chain, is liquid at room temperature, whereas monounsaturated fatty acids of this chain length occur only in the solid state at 20°C, irrespective of the position of the cis double bond. The incorporation of the structures of the invention into phospholipids makes it possible to transfer these favorable properties to the compounds of the invention, which is reflected inter alia in low phase transition temperatures. It is likewise possible, by extending the fatty acid chains, to more than double the vesicle diameter compared with liposomes prepared from conventional lecithins, which corresponds to the internal volume of ultrasound-prepared liposomes being eight times as large. It is thus possible to transport more than eight times as much active ingredient as is possible with conventional liposomes. In addition, preparations of large unilamellar vesicles (LUVs) in highly viscous solutions, for example sugar solutions, are possible, that is to say in a medium in which it is difficult to prepare liposomes by extrusion processes. The phase transition temperatures of the phospholipids with the extremely long fatty acids of the invention are, because of the cis double bond(s), in a region favorable for liposome preparations.

The compound of the general formula (I) has two variable components A and B, each of which can be modified individually. The compound of the invention of the formula (I) does not comprise a mixture of different molecules of indeterminate composition and chain length; on the contrary it is possible specifically to obtain a desired structure. This means that, if the desired product is an N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ammonium derivative, with y = 1 and z = 2 in formula (I), the compound is chemically defined and contains scarcely any

contributions from y = 1 and z = 1 or y = 1 and z = 3 etc. Preference is given to the use of hydroxypropyl derivatives of a very particular chain length essentially free of other chain lengths.

The compound of the formula (I) is, according to the invention, a homogeneous compound of defined structure. The compound is preferably more than 99% homogeneous in relation to the value of z. However, it is also possible to provide the compound with a homogeneity of more than 99.9% in relation to the value of z.

For B in the compound of the formula (I), preference is given to m = 1 with n = 2 to 8. Particular preference is given to n = 2 to 6, and even greater preference to 2 to 4. When z = 0, x is preferably an integer from 1 to 3 and is even more preferably 1.

If z = 1, y preferably has a value from 1 to 4, and if z = 1 to 5, y is preferably 1. In the case where y > 1, the radical $-CH_2(CHOH)_y-CH_2-OH$ is preferably derived from sugar alcohols having four hydroxyl groups for y = 2, five hydroxyl groups for y = 3 and six hydroxyl groups for y = 4. Examples of such radicals are mannitol derivatives for y = 4, lyxitol derivatives for y = 3 and threitol derivatives for y = 2.

It is possible and also preferred for x to be 0. In this case, y is 2 to 4 for z = 1. Or, in another preferred embodiment, z = 1 to 5 for y = 1.

It is possible and also preferred for m to be 0, in which case the compound of the formula (I) has a negative excess charge because of the negatively charged PO^-_3 group. For m = 0, x is preferably 0, and y = 1 for z = 1 to 5, or, in a likewise preferred embodiment, y = 2 to 4 for z = 1.

The radical R_3 is preferably CH_3, C_2H_5 or 1,2-dihydroxypropyl.

The groups of the formulae (III) to (VII) are preferably in enantiopure form. However, they may also be racemates.

The compound of the formula (I) is according to the invention a compound of defined structure. Monounsaturated alkyl chains are preferably more than 97% homogeneous, but may also be provided with homogeneity of more than 99%. Diunsaturated alkyl chains are preferably more than 90% homogeneous, but may also in some cases be provided in purities of > 97%.

The compound preferably comprises phospholipids with mono- or diunsaturated alkyl or acyl chains having 16-34 chain carbon atoms.

The compounds encompassed by the general formula (I) have excellent biological properties and are used as

1. liposome constituents for preparing liposomes for targeted accumulation of active ingredients or nucleic acids in target cells (alkyl/acyl chain length preferably 16-32 C atoms)

2. active ingredients against oncoses and protozoal infections (alkyl/acyl chain length preferably 16-26 C atoms) and

3. solubilizers for substances which are difficult to administer intravenously, such as, for example, Taxol (alkyl/acyl chain length preferably 16-30 C atoms).

Conventional liposomes have a residence time in serum of up to 5 hours but, especially on use of liposomes as

carriers of active pharmaceutical ingredients, it is desirable for the residence time of liposomes in the bloodstream to be as long as possible, but especially in conjunction with uptake in selected target cells.

It has emerged from ultrasound preparations of liposomes that symmetrical lecithins with (Z)-fatty acids having up to 24 carbon atoms form liposomes when mixed with cholesterol, and the homogeneity of the vesicle population is crucially determined by the position of the double bond. The precondition for a narrow standard deviation of the vesicle size is a particular distance of the double bond from the carboxyl function. There is evidently, by comparison with conventional lecithins, a significant increase in the vesicle diameter, which is 125 nm for (Z)-15-tetracosenoic acid (nervonic acid). Mixed-chain phosphatidylcholines with a saturated acyl chain in the *sn*-1 position also form vesicles with very long-chain (Z)-fatty acids, and it is to be assumed that there is interdigitation of the fatty acid chains. The average hydrodynamic liposome diameter on esterification with (Z)-15-triacontenoic acid (30:1 Δ^{15}) is 111 nm (stearic acid in the *sn*-1 position). A distinct enlargement of vesicles is also obtained by use of extremely long fatty acids in the case of phospholipids having a modified polar region, such as, for example, in the case of phosphatidyloligoglycerols, or in the case of phospholipids containing oligoglycerols linked via nitrogen atoms.

When the compound of the invention of general formula (I) is used as liposome constituent, the constituent A is preferably two-chain radical derived from glycerol, of the formulae (III) or (IV). In constituent B, these compounds preferably have an alkylammonium group, i.e. m is preferably equal to 1. The preferred parameters

for compounds of the formula (I) used as liposome constituents are:
m = 1, n = 2-6, x = 0, y = 1, z = 1-5 or
m = 1, n = 2-6, x = 0, y = 2-4, z = 1 or
m = 1, n = 2-6, x = 1, z = 0 or
m = 0, x = 0, y = 1, z = 1-5, preferably 2-4 or
m = 0, x = 0, y = 2-4, z = 1.
R_3 is in this case preferably 1,2-dihydroxypropyl, C_2H_5 or even more preferably CH_3. The compound preferably comprises hydroxypropyl derivatives with 1 to 3 hydroxypropyl units, i.e. x = 0 and z = 1 to 3. Since y is preferably 1, these involve 1,3-linked linear oligoglycerol residues which are linked to the nitrogen atom via a 2-hydroxypropyl radical.

These compounds which are suitable as liposome constituents preferably have 2 radicals, that is to say R_1 and R_2. These may be in each case independently a radical of one of the formulae (X) to (XIII). If R_1 and R_2 are identical, they preferably have a maximum chain length of, in each case, 16 to 26 C atoms. In another preferred embodiment, one of the radicals is longer than 26 C atoms and may preferably have up to 32 C atoms. In this case, a methyl radical is preferably present on the nitrogen, i.e. when z = 0, x is preferably 1. It is likewise preferred for at least of R_1 and R_2 to be a diunsaturated radical of the invention, and it is even more preferred for both R_1 and R_2 to be a diunsaturated radical of the invention.

One of the radicals R_1 and R_2 may also be a saturated acyl or alkyl radical. In this case, the other radical is a compound of one of the formulae (X) to (XIII), and is preferably a diunsaturated alkyl or acyl chain of the formula (XI) or (XIII).

In another preferred embodiment, the compound of the general formula (I) as liposome constituent may also

have a negative excess charge. This is the case when m = 0. Preference is given in this connection to glycero-glycerols and phosphatidyl-glycero-glycero-glycerols and phosphatidyl-glycero-glycero-glycero-glycerols (in these cases, x = 0, y = 1 and z = 2 to 4). Additionally preferred in this connection are the previously mentioned compounds with y > 1, i.e. the radical CH_2-(-CHOH)$_y$-CH_2-OH is preferably derived from sugar alcohols having 4 hydroxyl groups for y = 2, 5 hydroxyl groups for y = 3 and 6 hydroxyl groups for y = 4. Likewise preferred in this connection are phospho-*sn*-G_1 compounds.

Active ingredients of the invention are preferably compounds of the general formula (I) in which the structural parameter A is a radical of one of the formulae (VIII) or (IX). They are therefore unsaturated alkylphosphocholines.

The advantage of unsaturated chains in the apolar region is that such compounds can be administered intravenously. Active ingredients of the invention have better antitumor activity than erucylphosphochiline, the most effective compound to date. An increased cytostatic effect is obtained, for example, by shifting the cis double bond toward the phosphocholine group. Thus, even with the lowest dose, (Z)-10-docosenyl-1-phosphocholine (42 µmol/kg/week) shows a tumor reduction to 9% (T/C), whereas erucylphosphocholine with a dose which is more than twice as high (90 µmol/kg/week) shows a reduction only to 31% (T/C) (see example 5, table 1).

The preferred parameters for compounds of the formula (I) which are suitable as active ingredients are:
m = 1, n = 2-6, more preferably n = 2-4, x = 1, z = 0.

Compounds of the general formula (I) are particularly suitable as active pharmaceutical ingredients when they have an alkylammonium radical (i.e. m = 1) with which the distance between ammonium and phosphate is greater than or equal to 2, i.e. n is preferably 2, 3 or 4. In this case, R_3 is preferably a CH_3 or C_2H_5 group. It is likewise preferred for R_3 to be 1,2-dihydroxypropyl. These compounds are particularly active antitumor agents.

The most preferred compounds are those having an N,N,N-trimethylalkylammonium group, so that preference is given to z = 0 and x = 1.

It is preferred to dispense with a glycerol basic structure or a similar basic structure according to one of the formulae (III) to (VII) for active ingredients. The structural parameter A is thus preferably a compound of the formulae (VIII) or (IX). These are therefore preferably (Z)-alkenylphosphocholines or (Z,Z)-alkadienylphosphocholines.

If a monounsaturated alkyl radical is present, this preferably has 16 to 23 carbon atoms. This is because it has emerged that compounds with chains having 24 C atoms or more are distinctly less suitable. With a diunsaturated alkyl radical, longer chains are suitable, preferably having about 19 to 26 C atoms. It has emerged that diunsaturated chains with 16 to 18 carbon atoms are inactive. It should be particularly emphasized in this connection that alkadienylphosphocholines with a terminal double bond (i.e. r = 0) in formula (IX) have a marked antitumor effect even at very low dosage.

Compounds with a glycerol-like constituent also show antitumor activity, i.e. a compound according to one of the formulae (III) to (VII) may also be present on the

phosphate residue. If in this case 2 radicals R_1 or R_2 are present, however, it is important that one R is a short chain. This short chain is preferably an alkyl radical having 1 to 4 C atoms. The other radical R_1 or R_2 is then preferably a radical of the formula XII or XIII. It is, in particular, a radical of the formula XIII.

Additionally preferred compounds are those in which both radicals R_1 and R_2 are each linked by an ether linkage to the glycerol residue, i.e. they are each independently a group of the formula (XII) or (XIII). Particular preference is also given to a compound where R_1 and R_2 are the same mono- or diunsaturated radical of the invention.

Mention should be made, as another preferred embodiment of the compound of the general formula (I), of compounds which are distinguished by a good solubilizing property. The preferred structural parameters for compounds of the formula (I) suitable as solubilizers are:
m = 1, n = 2-6, x = 0, y = 1, z = 1-3, more preferably z = 1,
m = 1, n = 2-6, x = 0, y = 2-4; z = 1 or
m = 1, n = 2-6, x = 1, z = 0.
R_3 is prferably CH_3, C_2H_5 or 1,2-dihydroxypropyl.
Known compounds of this type encompass, for example, the erucyl (C_{22}) compounds. The compounds of the invention which are therefore preferred are those which have as structural parameter A a group according to one of the formulae (III) to (VII), where one of the radicals R_1 and R_2 is preferably a compound of the formulae (X) or (XI), i.e. one of the radicals R_1 or R_2 is preferably a diunsaturated chain according to the invention. Single-chain compounds are preferred for the solubilizers, i.e. when A is a group of the formulae

(III) or (IV), and one of R_1 and R_2 is -OH or an alkyl having 1 to 4 C atoms.

When A is a radical according to one of the formulae (V) to (VII), i.e. when only one R_1 is present, R_1 is likewise preferably a diunsaturated chain. Solubilizers of the invention are preferably in the form of esters, i.e. chains of the formula (X) or (XI) are preferred. Very particular preference is given in this connection in turn to compounds with one or two diunsaturated alkadienyl radicals. Some compounds of the classes already mentioned previously are also suitable here too. One example are the single-chain glycero-phospho compounds not hydroxylated on the nitrogen, i.e. m = 1, x = 1 and z = 0 in the structural parameter B.

Compounds particularly preferred as solubilizers are those having only one long-chain radical such as, for example, compounds based on lysolecithin which have an OH group on a C atom of the glycerol residue. Particularly preferred compounds are therefore those in which the structural parameter A is a radical according to one of the formulae (III) to (VII).

Some compounds with 2 radicals R_1 and R_2 also display particularly good solvent properties, however. Examples are those compounds in which R_1 and R_2 are two diunsaturated radicals having 16 to 24 C atoms.

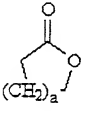
The present invention further relates to a process for preparing unsaturated (Z)-fatty acids or (Z,Z)-fatty acids or (Z)-alkenols or (Z,Z)-alkenols having 16 to 34 carbon atoms, the process of the invention making available diunsaturated (Z,Z)-fatty acids and alkenols which have more than one CH_2 group between the cis double bonds. A lactone which may comprise 13 to 19 C atoms is used as starting material for this process.

The process comprises the following steps:

1) cleavage of the lactone ring with a trimethylsilyl halide to give the corresponding trimethylsilyl halo-carboxylate,
2) simultaneous or subsequent alcoholysis of the trimethylsilyl halo-carboxylate to give the corresponding halo-carboxylic ester,
3) reaction of the halo-carboxylic ester with triphenylphosphane to give the corresponding phosphonium salt,
4) reaction of the phosphonium salt with an aldehyde using a base and subsequent hydrolysis to give a corresponding (Z)-fatty acid salt,
5) liberation of the (Z)-fatty acid from the (Z)-fatty acid salt, and
6) where appropriate conversion of the (Z)-fatty acid into the corresponding (Z)-alkenol using lithium aluminum hydride.

In step 1) there is preferably use of lactones of the formula (XIV)

(XIV)



where a = 10 to 16. The trimethylsilyl halides used to cleave the lactone ring are preferably trimethylsilyl iodide or trimethylsilyl chloride. The alcohol used for the alcoholysis in step 2) is preferably ethanol. The reaction of the phosphonium salt with an aldehyde is based on the procedure for a Wittig reaction in the absence of lithium salts, which is also referred to as a salt-free Wittig reaction. The stereoselectivity of such reactions is generally elicited by sodium- or potassium-containing bases, and therefore preferred

bases are, for example, $NaNH_2$, potassium tert-butoxide, NaHMDS or KHMDS. NaHMDS is particularly preferred. The hydrolysis and subsequent liberation and, where appropriate, the conversion of the fatty acids into an alkenol takes place by known processes.

A particularly preferred embodiment of the process of the present invention is the process for preparing nervonic acid ((Z)-15-tetracosenoic acid). This entails using cyclopentadecanolide as starting lactone and pelargonaldehyde as aldehyde in step 4. This process can be used to synthesize nervonic acid, which occurs only in small amounts in nature, even on an industrial scale.

The present invention further relates to liposomes comprising phospholipid-like compounds of the formula (I) as constituents of the liposome shell. These liposomes additionally contain phospholipids and/or alkylphospholipids and, where appropriate, cholesterol, the liposomes containing 1 to 50 mol% of a compound according to the invention of the formula (I) or salt thereof and, together with the phospholipids, the alkylphospholipids and the cholesterol, resulting in 100 mol% of the liposome shell.

The liposomes of the invention have a distinctly increased internal volume. They are thus able to transport a larger amount of active ingredient and/or nucleic acids. Preferred liposomes of the invention additionally comprise an active ingredient and, where appropriate, pharmaceutically acceptable diluents, excipients, carriers and fillers. The liposomes may comprise a nucleic acid in addition to the active ingredient or in place of the active ingredient. It is also possible according to the invention to use as active ingredients the active ingredients of the invention.

The present invention further relates to a pharmaceutical composition which comprises as active constituent a compound of the formula (I) which is suitable as active ingredient. The pharmaceutical composition may moreover additionally comprise pharmacologically acceptable diluents, excipients, carriers and fillers.

The present invention further relates to the use of the compounds of the invention as liposome constituents, as pharmacological active ingredients or as solubilizers. It has emerged that some of the compounds of the invention show a particularly good antitumor effect. Compounds of the invention can be employed not only as antitumor active ingredient but also against protozoal infections such as, for example, leishmaniosis or trypanosomiasis. They can likewise be used to promote the solubility of substances of low solubility in water, for example Taxol, so that these substances can also be administered intravenously in conjunction with the solubilizers of the invention.

The active ingredients which can be used are generally all active ingredients which can in fact be introduced by means of liposomes into the plasma. Preferred groups of active ingredients are, on the one hand, cytostatics, especially anthracycline antibiotics, such as, for example, doxorubicin, epirubicin or daunomycin, with doxorubicin being particularly preferred. Further preferred cytostatics are idarubicin, alkylphosphocholines in the structural variations described by us, 1-octadecyl-2-methyl-rac-glycero-3-phosphocholine and structural analogs derived therefrom, 5-fluorouracil, cis-platinum complexes such as carboplatin and Novantrone, and mitomycins.

Further preferred groups of active ingredients are immunomodulating substances such as, for example, cytokines, and among these in turn interferons and, in particular, α-interferon are particularly preferred, substances with antimycotic activity (for example amphotericin B) and active ingredients against protozoal infections (malaria, trypanosome and leishmania infections). Taxol is likewise preferred as active ingredient.

A further preferred group of active ingredients are lytic active ingredients as described in DE 41 32 345 A1. Miltefosine, edelfosine, ilmofosine and SRI62-834 are preferred. Alkylphosphocholines, also with extended alkyl chains, for example erucylphosphocholine and erucylphosphocholines with extended phospho-nitrogen distance, are particularly preferred.

The present invention further relates to the use of liposomes of the invention for producing an antitumor composition, where the active ingredient is particularly preferably doxorubicin.

The present invention additionally relates to the use of the liposomes of the invention for producing a composition for influencing the proliferation of cells, where the active ingredient is a cytokine, particularly preferably α-interferon.

The liposomes of the present invention can thus also be used as transport vehicles and specifically as gene transport vehicles.

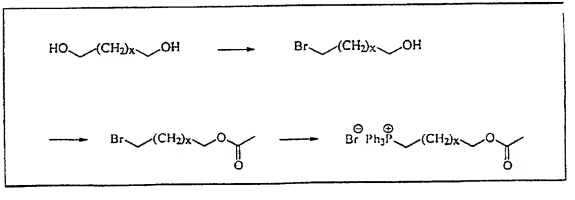
The process and the compounds of the general formula (I) are illustrated in more detail in the following examples.

Examples

Example 1: Synthesis of ω-substituted phosphonium salts

1a) Synthesis by monobromination of α,ω-diols

The starting materials used for synthesizing olefinic alcohols are alkanediols, which are monobrominated with 48% strength hydrobromic acid to give ω-bromoalkan-1-ols. After acetylation of the remaining hydroxyl group, the compounds are fused with triphenylphosphane to give the triphenylphosphonium bromides substituted in the ω position. The latter are deprotonated with NaHMDS and then converted into olefins with unsubstituted aldehydes and subsequently hydrolyzed to (Z)-fatty alcohols.



Synthesis of [ω(acetoxy)alkyl]triphenylphosphonium bromides by monobromination of α,ω-diols

Monobromination

6-Bromo-1-hexanol

200.8 g (1.70 mol) of 1,6-hexanediol, 600 ml of 48% strength hydrobromic acid and 2 l of toluene were heated under reflux with vigorous stirring for 2 hours. After cooling to room temperature, the phases were separated. The organic phase was washed with 2 × 500 ml of saturated $NaHCO_3$ solution and 700 ml of water. Removal of the solvent resulted in 301.2 g (1.66 mol, 98%) of 6-bromo-1-hexanol.

MW = 181.07 g/mol ($C_6H_{13}BrO$)

R_f (precursor) = 0.19 (diethyl ether)
R_f = 0.59 (diethyl ether)

10-Bromo-1-decanol

87.8 g (0.50 mol) of 1,10-decanediol, 165.1 g of 48% strength hydrobromic acid and 2.5 l of high-boiling petroleum ether (b.p. 100-140°C) were heated under reflux with vigorous stirring for 4 hours. A further 80.0 g of 48% strength hydrobromic acid were added, and the mixture was boiled for 5 hours. After cooling to 30°C, the phases were separated. The organic phase was washed first with a solution of 100 g of Na_2CO_3 in 500 ml of water and then with 2 × 500 ml of water. Removal of the solvent was followed by chromatography on 700 g of silica gel. The byproduct 1,10-dibromodecane was eluted with cyclohexane/diethyl ether (20:1). Chromatography with cyclohexane/diethyl ether (2:1) afforded 103.9 g (0.44 mol, 87%) of 10-bromo-1-decanol.

MW = 237.18 g/mol ($C_{10}H_{21}BrO$)
R_f = 0.38 (diisopropyl ether)
^{1}H-NMR (300 MHz, $CDCl_3$): δ = 1.30-1.43 (m, 12H, $(CH_2)_6$), 1.57 (m, 2H, $C\underline{H}_2CH_2OH$), 1.85 (mc, 2H, $C\underline{H}_2CH_2Br$), 2.22 (s, D_2O-exchangeable, 1H, OH), 3.41 (t, ^3J = 6.9 Hz, 2H, $C\underline{H}_2Br$), 3.64 (t, ^3J = 6.7 Hz, 2H, $C\underline{H}_2OH$)

Acetylation to give ω-bromoalkyl acetates

Acetylation of the ω-bromoalkan-1-ols is carried out with acetic anhydride in THF with catalysis by DMAP. The esterifications take place rapidly at 30°C, irrespective of the chain length of the compound, and are complete only a few minutes after addition of the reactive anhydride.

6-Bromohexyl acetate

20.1 g (0.16 mol) of DMAP were added to 297.4 g (1.64 mol) of 6-bromo-1-hexanol in 1500 ml of THF. A solution of 184.4 g (1.81 mol) of acetic anhydride in

300 ml of THF was added dropwise in such a way that the reaction temperature did not exceed 30°C. After completion of the addition, the mixture was stirred for a further 30 minutes. The reaction mixture was mixed with 500 ml of diisopropyl ether and extracted successively with 700 ml each of water, 2 × saturated $NaHCO_3$ solution and water. After drying over sodium sulfate, the solvent was removed in vacuo. 352.8 g (1.58 mol, 96%) of 6-bromohexyl acetate were obtained.

MW = 223.11 g/mol ($C_8H_{15}BrO_2$)

R_f = 0.81 (diethyl ether)

^{1}H-NMR (300 MHz, $CDCl_3$): δ = 1.33-1.53 (m, 4H, $(CH_2)_2$), 165 (mc, 2H, CH_2CH_2O), 1.87 (mc, 2H, CH_2CH_2Br), 2.04 (s, 3H, $OOCCH_3$), 3.41 (t, ^3J = 6.8 Hz, 2H, CH_2Br), 4.06 (t, ^3J = 6.7 Hz, 2H, CH_2O)

IR (film): ν[cm^{-1}] = 2937 (s), 2859 (s), 1736 (s), 1460 (m), 1365 (m), 1240 (s), 1044 (m), 731 (w), 641 (w), 561 (w)

Quaternization to give phosphonium bromides

[10-(Acetoxy)decyl]triphenylphosphonium bromide

117.3 g (0.42 mol) of the appropriate ω-substituted alkyl bromide/iodide and 110.2 g (0.4 mol) of triphenylphosphane were heated at 130°C with stirring (glass stirrer) for 12 hours. The heating was removed and the mixture was allowed to cool to 90°C. 400 ml of THF were slowly added through the reflux condenser to the reaction mixture, which was stirred until a homogeneous phase was formed. It was allowed to cool to room temperature.

Addition of 2 l of diethyl ether was followed by vigorous stirring for 30 minutes. After standing for several days at -20°C, the supernatant solvent was decanted off from the solid phoshonium salt. The product was mixed with 800 ml of toluene and stirred at 60°C for several hours. After phase separation, the phosphonium salt was taken up in 300 ml of

dichloromethane. 3 l of diethyl ether were added and the mixture was left at -20°C for several days. After renewed decantation off, the product was dissolved in dichloromethane and transferred into a flask. The phosphonium salt was dried in vacuo at 80°C for 6 hours. 181.6 g (335 mmol, 80%) of [10-(acetoxy)-decyl]triphenylphosphonium bromide were obtained as a yellow, highly viscous oil.

MW = 541.51 g/mol ($C_{30}H_{38}BrO_2P$)

R_f = 0.23 (chloroform/methanol, 9:1)

Analysis:	**C**	**H**	**P**
Calculated	66.54	7.07	5.72
Found	66.67	7.06	5.55

1b) Synthesis via ω-halo carboxylic acids

Ethyl 11-bromoundecanoate

1000 g of 90% pure 11-bromoundecanoic acid (equivalent to 3.39 mol), 304.0 g (6.60 mol) of ethanol and 20.0 g of p-toluenesulfonic acid were introduced into 400 ml of chloroform in an experimental apparatus with water trap (for entrainers with higher specific gravity than water). The mixture was heated under reflux until water no longer separated out (about 6 hours). After the solution had cooled to room temperature it was washed successively with 1 l of water, 500 ml of saturated $NaHCO_3$ solution and 1 l of water. The solvent was removed in vacuo. Vacuum distillation (b.p. 131-133°C/1 mbar) resulted in 716.3 g (2.44 mol, 72%) of ethyl 11-bromoundecanoate.

MW = 293.24 g/mol ($C_{13}H_{25}BrO_2$)

R_f = 0.66 (cyclohexane/diisopropyl ether, 1:1)

Analysis:	**C**	**H**
Calculated	53.25	8.59
Found	53.22	8.57

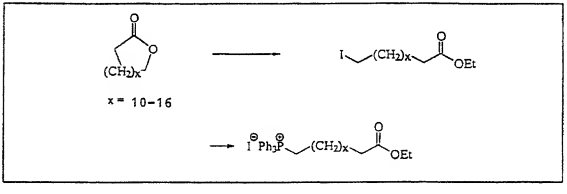
^{1}H-NMR (300 MHz, $CDCl_3$): δ = 1.23-1.42 (m, 15H, $COOCH_2\underline{CH_3}$, 6 × CH_2), 1.62 (mc, 2H, $C\underline{H_2}CH_2COO$), 1.85 (mc, 2H, $C\underline{H_2}CH_2Br$), 2.29 (t, ^{3}J = 7.5 Hz, 2H, $C\underline{H_2}COO$); 3.41

(t, ^3J = 6.9 Hz, 2H, CH_2Br), 4.12 (quart, ^3J = 7.1 Hz, 2H, $COOCH_2CH_3$)
IR (film): ν[cm^{-1}] = 2930 (s), 2854 (s), 1737 (s), 1464 (m), 1372 (m), 1179 (s), 1118 (m), 723 (w), 645 (w), 563 (w)

ω-Iodo-carboxylic esters

Central intermediates in the synthesis of (Z)-15- and (Z)-16-olefins:

Lactone cleavage of cyclopentadecanolide and cyclohexadecanolide with trimethylsilyl iodide and subsequent alcoholysis results in the ethyl ω-iodo-carboxylates.



Lactone cleavage

Ethyl 15-iodopentadecanoate

150.3 g (0.63 mol) of cyclopentadecanolide were dissolved in 500 ml of acetonitrile under a nitrogen atmosphere, and 229.0 g (1.53 mol) of sodium iodide were added. 170 ml (1.34 mol) of trimethylsilyl chloride were added dropwise through a septum. The mixture was heated under reflux for 18 hours. 158.5 g (3.44 mol) of ethanol were cautiously added to the boiling reaction mixture, which was heated under reflux for a further 2 hours and then allowed to cool to room temperature. 500 ml of diethyl ether were added and the mixture was extracted three times with 500 ml of 1N sodium hydroxide solution each time. The aqueous phases were back-extracted with 300 ml of diethyl ether, and

the solvent was removed from the combined organic phases in vacuo. The residue was crystallized from methanol twice at -20°C. Drying in vacuo for several days resulted in 202.3 g (0.51 mol, 81%) of ethyl 15-iodopentadecanoate. Although the product was obtained in good purity, it had an intense odor of precursor owing to very small amounts of lactone (perfumed!).

MW = 396.35 g/mol ($C_{17}H_{33}IO_2$)

R_f (intermediate) = 0.15 (dichloromethane/diisopropyl ether, 50:1)

R_f = 0.73 (dichloromethane/diisopropyl ether, 50:1)

Analysis:	C	H
Calculated	51.52	8.39
Found	51.40	8.24

Melting point: 31.4°C

^{1}H-NMR (300 MHz, $CDCl_3$): δ = 1.19-1.38 (m, 23H, $COOCH_2\underline{CH_3}$, 10 × CH_2), 1.61 (mc, 2H, $C\underline{H_2}CH_2COO$), 1.82 (mc, 2H, $CH_2\underline{CH_2}I$), 2.29 (t, ^3J = 7.6 Hz, 2H, $C\underline{H_2}COO$), 3.19 (t, ^3J = 7.0 Hz, 2H, $C\underline{H_2}I$), 4.12 (quart, ^3J = 7.1 Hz, 2H, $COO\underline{CH_2}CH_3$)

IR (KBr): ν[cm^{-1}] = 2916 (s), 2848 (s), 1735 (s), 1474 (w), 1464 (w), 1294 (w), 1248 (w), 1200 (m), 1166 (m), 720 (w)

Conversion into phosphonium salts

[14-(Ethoxycarbonyl)tetradecyl]triphenylphosphonium iodide

119.0 g (0.30 mol) of the appropriate ω-substituted alkyl bromide/iodide and 78.8 g (0.30 mol) of triphenylphosphane were heated at 130°C with stirring (glass stirrer) for 12 hours. The heating was removed and the mixture was allowed to cool to 90°C. 400 ml of THF were slowly added through the reflux condenser to the reaction mixture, which was stirred until a homogeneous phase formed. It was allowed to cool to room temperature.

The product was precipitated by adding 2 l of diethyl ether at 0°C, and the resulting mixture was stirred at 4°C for one day. It was then filtered with suction as quickly as possible through a large glass fiber filter, the residue was dissolved in dichloromethane and transferred into a flask. The solvent was removed in vacuo and then the phosphonium salt was dried in vacuo at 70°C for 7 hours (in a rotary evaporator). 197.5 g (0.30 mol, 100%) of [14-(ethoxycarbonyl)tetradecyl]triphenylphosphonium iodide were obtained.

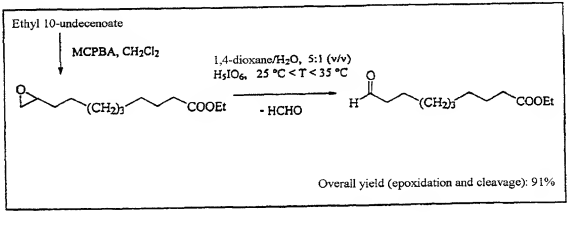
MW = 658.64 g/mol ($C_{35}H_{48}IO_2P$)

R_f = 0.53 (chloroform/methanol, 9:1)

Analysis:	C	H	P
Calculated	63.83	7.35	4.70
Found	64.00	7.42	4.61

^{1}H-NMR (300 MHz, $CDCl_3$): δ = 1.19-1.28 (m, 25H, $COOCH_2CH_3$, 11 × CH_2), 1.63 (m, 2H, CH_2CH_2COO), 2.28 (t, ^3J = 7.5 Hz, 2H, CH_2COO), 3.66 (m, 2H, $CH_2P^+Ph_3I^-$), 4.12 (quart, ^3J = 7.1 Hz, 2H, $COOCH_2CH_3$), 7.69-7.86 (m, 15H, aromatic-H)

Example 2: Synthesis of ω-substituted aldehydes



Direct epoxide cleavage with periodic acid in aqueous 1,4-dioxane

Ethyl 10,11-epoxyundecanoate

283.7 g (1.2 mol) of 73% pure m-chloroperoxybenzoic acid were added over the course of 1 1/2 hours to 212.4 g (1.0 mol) of ethyl 10-undecenoate in 2 l of

dichloromethane, maintaining the temperature below 20°C. After stirring at room temperature for 5 hours (glass stirrer) the reaction mixture was kept at -20°C overnight. The precipitated m-chlorobenzoic acid was filtered off with suction and washed with 500 ml of cold pentane (-20°C). The solvent was removed from the filtrate in vacuo, and the residue was taken up in 1 l of pentane. This solution was cautiously extracted with 2 × 500 ml of saturated $NaHCO_3$ solution and 500 ml of water. After drying over sodium sulfate, the solvent was removed in vacuo. The epoxide synthesized in this way still contained m-chlorobenzoic acid.

Crude yield: 259.5 g

MW = 228.33 g/mol ($C_{13}H_{24}O_3$)

R_f = 0.44 (dichloromethane/diisopropyl ether 50:1)

Oxidation of ω-halo compounds using pyridine N-oxide

6-Acetoxyhexanal

29.0 g (130 mmol) of 6-bromohexyl acetate, 31.6 g (332 mmol) of pyridine N-oxide, 26.8 g (319 mmol) of $NaHCO_3$ and 200 ml of toluene were heated under reflux in an inert gas atmosphere for 18 hours. The reaction solution was washed with 400 ml of water, and the aqueous phase was back-extracted with 300 ml of toluene. After the solvent had been distilled out of the combined organic phases in vacuo, the crude product was filtered through a column of 300 g of silica gel (diisopropyl ether/cyclohexane, 1:1).

Yield: 12.5 g (79 mmol, 61%)

MW = 158.20 g/mol ($C_8H_{14}O_3$)

R_f = 0.44 (diisopropyl ether)

Analysis:	C	H
Calculated	60.74	8.92
Found	60.66	8.92

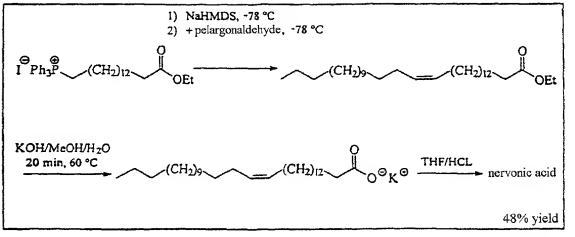
^{1}H-NMR (300 MHz, $CDCl_3$): δ = 1.30-1.41 (m, 2H, 4-CH_2), 1.57-1.68 (m, 4H, CH_2CH_2CHO, CH_2CH_2O), 2.00 (s, 3H, $OOCCH_3$), 2.42 (dt, $^3J_{2,1}$ = 1.6 Hz, $^3J_{2,3}$ = 7.3 Hz, 2H,

CH_2CHO), 4.02 (t ^3J = 6.6 Hz, 2H, CH_2O), 9.73 (t, ^3J = 1.6 Hz, 1H, CHO)
IR (film): $\nu[cm^{-1}]$ = 2941 (s), 2865 (s), 2724 (m), 1736 (s), 1462 (m), 1389 (m), 1367 (s), 1241 (s), 1048 (s), 634 (m), 607 (m)

Example 3

The (Z)-alkenols and the monounsaturated (Z)-fatty acids are synthesized by stereoselective Wittig reaction of an ω-substitued aldehyde with an unsubstituted phosphonium salt and by reaction of an ω-substitued phosphonium salt with an unsubstituted aldehyde, respectively.

Unsubstituted aldehydes with a purity of more 97% are commercially available chemicals up to a chain length of 12 carbon atoms (dodecanal) and can be employed directly in the Wittig reaction. Longer-chain aldehydes can be obtained from purchasable fatty alcohols by Swern or Kornblum oxidation. Unsubstituted alkyl halides (mainly bromides and chlorides) are used to prepare simple phosphonium bromides, it being possible to purchase alkyl halides in a purity of more than 97%. Reference is made in example 1 and 2 to the synthesis of ω-substitued Wittig precursors. The generation of ylide solutions from phosphonium iodides is simpler because the deprotonation starts even at relatively low temperatures, and there is thus no need to heat the reaction mixture. The fatty acids can in some cases be obtained in good purity without chromatographic purification by precipitating their potassium salts.



Nervonic acid synthesis

Unsaturated fatty acids can be converted into the corresponding fatty alcohols using lithium aluminum hydride by processes described in the literature.

(Z)-Stereoselective Wittig reaction of an ω-substituted phosphonium bromide

(Z)-10-Docosen-1-ol

86.7 g (160 mmol) of [10-(acetoxy)decyl]triphenylphosphonium bromide were introduced into 400 ml of dry THF. Under an argon atmosphere, 200 ml of sodium bis(trimethylsilyl)amide (1M in THF) were slowly injected into the reaction solution. Stirring (glass stirrer) at room temperature for 30 minutes was followed by heating under reflux for one hour. The ylide solution was then cooled firstly to 10°C and then to -78°C and, after stirring at this temperature for 30 minutes. 30.0 g (163 mmol) of lauraldehyde in 50 ml of THF were slowly added dropwise. The mixture was stirred for a further 30 minutes and then allowed to warm to room temperature overnight.

Workup

The reaction mixture was mixed with 600 ml of water and 200 ml of diethyl ether, the phases were separated, and the solvent was removed from the organic phase in vacuo. For the hydrolysis, a solution of 25 g of

potassium hydroxide in 10 ml of water/200 ml of methanol was added, and the mixture was stirred at 60°C for 20 minutes. The reaction solution was mixed with 600 ml of water and extracted with 300 ml of diethyl ether. After the organic phase had been washed with 500 ml of saturated $NaHCO_3$ solution and 500 ml of water, the solvent was distilled off in vacuo. The crude product was purified by column chromatography (cyclohexane/diisopropyl ether: gradual increase in the polarity from 19:1 to 1:1) on 550 g of silica gel. The compound was precipitated from acetone at -20°C. Drying in a desiccator for several days resulted in 26.8 g (82.6 mmol, 52%) of the long-chain fatty alcohol.

^{1}H-NMR (300 MHz, $CDCl_3$): δ = 0.88 (t, ^3J = 6.6 Hz, 3H, alkyl-CH_3), 1.23-1.30 (m, 30H, -CH_2-), 1.56 (mc, 2H, $C\underline{H}_2CH_2OH$), 2.00 (m, 4H, allyl-H), 3.64 (t, ^3J = 6.2 Hz, 2H, $C\underline{H}_2OH$), 5.35 (t, $^3J_{cis}$ = 3.8 Hz, 2H, -CH=CH-cis)

IR (KBr): ν[cm^{-1}] = 3366 (m), 2998 (m), 2918 (s), 2848 (s), 1459 (m), 1366 (w), 1067 (m), 724 (m), 688 (w), 580 (w)

MW ($C_{22}H_{44}O$) = 324.59 g/mol

Analysis:	C	H
Calculated	81.41	13.66
Found	81.56	13.72

Stereoselective Witting reaction of an ω-substituted phosphonium iodide

(Z)-15-Tetracosenoic acid (nervonic acid)

197.4 g (300 mmol) of the appropriate phosphonium salt were introduced into 1100 ml of dry THF under an inert gas atmosphere. After cooling to -78°C, 360 ml of sodium bis(trimethylsilyl)amide (1M in THF) were slowly added dropwise to the reaction solution while stirring (glass stirrer). After stirring at this temperature for 30 minutes, a solution of 47.0 g (330 mmol) of pelargonaldehyde in 50 ml of THF was added dropwise over a period of 40 minutes; after stirring vigorously

for 30 minutes, the mixture was allowed to warm to room temperature overnight.

Workup

50 ml of water were added to the reaction mixture, and then the solvent was removed in vacuo. A solution of 25 g of potassium hydroxide in 10 ml of water/200 ml of methanol was added, and the reaction solution was stirred at 60°C for 20 minutes. Azeotropic drying was then carried out with addition of toluene and distillation in vacuo. The residue was heated with 1.5 l of acetone while stirring vigorously at 60°C for 10 minutes. The potassium salt which precipitated during this was filtered off with suction and washed several times with acetone. The product was dissolved off the filter using a solution of 600 ml of THF/150 ml of concentrated hydrochloric acid. The resulting two-phase mixture was mixed with 500 ml of diisopropyl ether and the phases were separated. The organic phase was washed three times with 500 ml of water each time and dried over sodium sulfate, and the solvent was distilled off in vacuo.

The crude product was purified by column chromatography on 1100 g of silica gel. The apolar impurity was eluted first with cyclohexane/diisopropyl ether (19:1). Chromatography with cyclohexane/diisopropyl ether (1:1) afforded the product.

The acid was dissolved in acetone with heating, and crystallized at -20°C. In the dry state, 52.5 g (142 mmol, 48%) of fatty acid were obtained as a white crystalline powder.

MW = 366.63 g/mol ($C_{24}H_{46}O_2$)

Analysis:	C	H
Calculated	78.63	12.65
Found	78.77	12.52

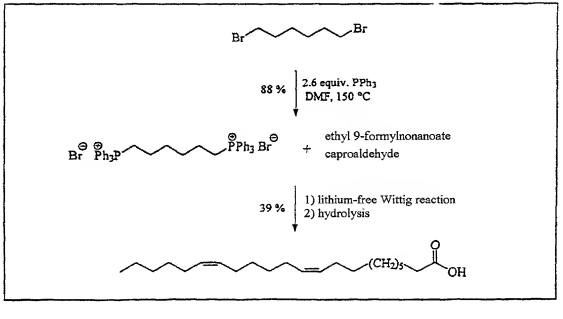
Melting point: 41.1°C (Lit. 42-43°C)

It is also possible to prepare monounsaturated (Z)-alkenols and (Z)-fatty acids by reacting ω-substituted aldehydes with saturated phosphonium salts by the processes described above.

Terminally unsaturated alkadienecarboxylic acids are obtained by (Z)-selective Wittig reaction of a terminally unsaturated aldehyde with an ω-substituted phosphonium salt (for example 10-undecenal).

Example 4

Reaction of α,ω-dibromoalkanes at both ends with triphenylphosphane results in α,ω-bis(triphenylphosphonio)alkane dibromides. After conversion into the bisphosphorane, stereospecific conversion into an olefin takes place under salt-free conditions with a solution of a substituted and an unsubstituted aldehyde. Alkaline hydrolysis of the resulting ester affords, depending on the aldehyde used, (Z,Z)-alkadienols or (Z,Z)-fatty acids.



Lithium salt-free crossed Wittig reaction of a bisphosphonium salt with an unsubstituted and with an

ω-substituted aldehyde: synthesis of (Z,Z)-10,16-docosadien-1-ol

Synthesis of an α,ω-bis(triphenylphosphonio)alkane dibromide

1,6-Bis(triphenylphosphonio)hexane dibromide (62)

122.2 g (0.50 mol) of 1,6-dibromohexane were dissolved together with 341.7 g (1.30 mol) of triphenylphosphane in 1500 ml of DMF. The reaction mixture was heated under reflux with stirring (glass stirrer) for 4 hours. It was allowed to cool to room temperature. The product was filtered off with suction and washed with 2 x 250 ml of acetone and 200 ml of diethyl ether. Drying in vacuo for several days resulted in 336.5 g (0.44 mol, 88%) of the crystalline bisphoshonium salt.

MW = 768.55 g/mol ($C_{42}H_{42}Br_2P_2$)

R_f = 0.26 (chloroform/methanol, 9:1)

Analysis:	C	H	P
Calculated	66.64	5.51	8.06
Found	65.77	5.59	7.98

Crossed Wittig reaction

(Z,Z)-10,16-Docosadienoic acid

76.9 g (100 mmol) of 1,6-bis(triphenylphosphonio)hexane dibromide were suspended in 500 ml of THF. 240 ml (240 mmol) of sodium bis(trimethylsilyl)amide (1M in THF) were injected through a septum under an inert gas atmosphere. The ylide solution was stirred at room temperature for 30 minutes and then under reflux for 1 hour. After it had been cooled to -78°C, a solution of 21.5 g (100 mmol) of ethyl 9-formylnonanoate and 10.1 g (101 mmol) of caproaldehyde in 50 ml of THF was added dropwise over the course of 30 minutes. The mixture was stirred for a further 30 minutes and then allowed to warm to room temperature overnight.

50 ml of water were added to the reaction mixture, and then the solvent was removed in vacuo. A solution of

25 g of potassium hydroxide in 10 ml of water/200 ml of methanol were added, and the reaction solution was stirred at 60°C for 20 minutes. It was then dried azeotropically by addition of toluene and distillation in vacuo. The residue was heated with 1.5 l of acetone while stirring vigorously at 60°C for 10 minutes. The potassium salt which precipitated during this was filtered off with suction and washed several times with acetone. The product was dissolved off the filter using a solution of 600 ml of THF/150 ml of concentrated hydrochloric acid. The resulting two-phase mixture was mixed with 500 ml of diisopropyl ether, and the phases were separated. The organic phase was washed three times with 500 ml of water each time and dried over sodium sulfate, and the solvent was distilleed off in vacuo.

The crude product was purified by column chromatography (cyclohexane/diisopropyl ether; gradual increase in the polarity from 4:1 to 1:1) on 400 g of silica gel. 13.0 g (38.6 mmol, 39%) of the diunsaturated fatty acid were obtained.

MW = 336.56 g/mol ($C_{22}H_{40}O_2$)

R_f = 0.35 (cyclohexane/diisopropyl ether, 1:1)

Analysis:	**C**	**H**
Calculated	78.51	11.98
Found	78.30	11.92

^{1}H-NMR (300 MHz, $CDCl_3$): δ = 0.89 (t, ^3J = 6.8 Hz, 3H, $-CH_3$), 1.30-1.43 (m, 20H, 10 x CH_2), 1.63 (mc, 2H, $C\underline{H}_2CH_2COOH$), 2.03 (bs, 8H, allyl-H), 2.35 (t, ^3J = 7.5 Hz, 2H, $C\underline{H}_2COOH$), 5.34 (mc, 4H, -CH=CH-cis)

Example 5
Comparison of the known antitumor active ingredient erucylphosphocholine with active ingredients of the invention

Comparison of a compound not of the invention (erucylphosphocholine) with two active ingredients of the invention is shown in Table 1.

Table 1

Alkylphosphocholine	Weekly dose [μmol/kg]	T/C [%]*
Erucylphosphocholine (data taken from Kaufmann-Kolle et al. 1996)	90	31
	180	6
	360	< 0.1
(Z)-10-Docosenyl-1-PC	42	9
	170	0.5
	256	0.2
(Z)-11,21-Docosadienyl-1-PC	42	8
	170	2

Table 1: * Quotient of the median tumor volume in the treated and the control group × 100. Evaluation after therapy for 5 weeks.

After the lack of activity of a (Z,Z)-alkadienylphosphocholine with methylene-interrupted double bonds and based on the C_{18} chain had been demonstrated, it was possible to restore the activity of the class of substances by extending the alkadienyl chain and isolating the double bonds more markedly from one another (table 2).

Table 2

Unsaturated alkylphosphocholine	Dose [μmol/kg]	Median tumor volume [cm^3]	
		End of therapy	2 weeks later
(Z)-12-Heneicosenyl-1-phosphocholine	42	3.4	4.5
	84	0.3	1.2
	170	0.1	0.1
	256	0.2	0.8
(Z)-10-Docosenyl-1-phosphocholine (double bond in ω-12 position)	42	4.0	4.5
	84	1.2	3.4
	170	0.2	0.2
	256	0.1	0.2
(Z)-16-Docosenyl-1-phosphocholine (double bond in ω-6 position)	42	26.9	--
	84	2.5	7.6
	170	0.2	0.4
(Z,Z)-6,12-Eicosadienyl-1-PC	42	10	13.9
	84	3.2	13.9
	170	0.4	1.9
	256	0	0
(Z)-11,21-Docosadienyl-1-PC	42	1.5	2.5
	84	0.9	2.9
	170	0.4	0.5
(Z,Z)-10,16-Docosadienyl-1-PC	42	7.5	11.4
	84	0.6	0.6
	170	0.5	0.7

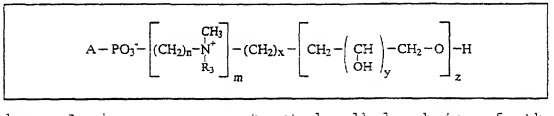
Example 6: Exemplary compounds

The Rf values of the exemplary compounds were determined in the system $CHCl_3/CH_3OH$/glacial acetic acid/H_2O: 100/60/20/5 (proportions by volume). They are grouped very closely together, specifically as follows:

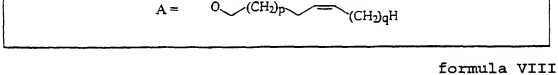
Rf	Compounds Nos.
0.10-0.15	1454-1496
0.15-0.20	1399 - 1453; 1543 - 1555
0.20-0.25	1320 - 1398; 1523 - 1542; 1752-1812
0.25-0.30	1497 - 1522; 1691 - 1751
0.30-0.35	1083 - 1319; 1556 - 1568; 1630 - 1690
0.35-0.40	1569 - 1629
0.40-0.45	1813 - 1839
0.30-0.40	1 - 1082

1. Examples of (Z)-alkenylphosphocholines

(A = VIII; n = 2; R_3, CH_3; m = 1, x = 1, z = 0)



where A is a monounsaturated alkyl chain of the following structure (p, q ≥ 0; 12 ≤ p+q ≤ 30):



formula VIII

16 chain carbon atoms

$C_{21}H_{44}NO_4P$ (405.56)

1. (Z)-3-hexadecenyl-1-phosphocholine
2. (Z)-4-hexadecenyl-1-phosphocholine
3. (Z)-5-hexadecenyl-1-phosphocholine
4. (Z)-6-hexadecenyl-1-phosphocholine
5. (Z)-8-hexadecenyl-1-phosphocholine
6. (Z)-9-hexadecenyl-1-phosphocholine

7. (Z)-10-hexadecenyl-1-phosphocholine
8. (Z)-11-hexadecenyl-1-phosphocholine
9. (Z)-12-hexadecenyl-1-phosphocholine
10. (Z)-13-hexadecenyl-1-phosphocholine
11. (Z)-14-hexadecenyl-1-phosphocholine
12. 15-hexadecenyl-1-phosphocholine

17 chain carbon atoms

$C_{22}H_{46}NO_4P$ (419.59)

13. (Z)-3-heptadecenyl-1-phosphocholine
14. (Z)-4-heptadecenyl-1-phosphocholine
15. (Z)-5-heptadecenyl-1-phosphocholine
16. (Z)-6-heptadecenyl-1-phosphocholine
17. (Z)-7-heptadecenyl-1-phosphocholine
18. (Z)-8-heptadecenyl-1-phosphocholine
19. (Z)-9-heptadecenyl-1-phosphocholine
20. (Z)-10-heptadecenyl-1-phosphocholine
21. (Z)-11-heptadecenyl-1-phosphocholine
22. (Z)-12-heptadecenyl-1-phosphocholine
23. (Z)-13-heptadecenyl-1-phosphocholine
24. (Z)-14-heptadecenyl-1-phosphocholine
25. (Z)-15-heptadecenyl-1-phosphocholine
26. 16-heptadecenyl-1-phosphocholine

18 chain carbon atoms

$C_{23}H_{48}NO_4P$ (433.61)

27. (Z)-3-octadecenyl-1-phosphocholine
28. (Z)-4-octadecenyl-1-phosphocholine
29. (Z)-5-octadecenyl-1-phosphocholine
30. (Z)-6-octadecenyl-1-phosphocholine
31. (Z)-7-octadecenyl-1-phosphocholine
32. (Z)-8-octadecenyl-1-phosphocholine
33. (Z)-10-octadecenyl-1-phosphocholine
34. (Z)-11-octadecenyl-1-phosphocholine

35. (Z)-12-octadecenyl-1-phosphocholine
36. (Z)-13-octadecenyl-1-phosphocholine
37. (Z)-14-octadecenyl-1-phosphocholine
38. (Z)-15-octadecenyl-1-phosphocholine
39. (Z)-16-octadecenyl-1-phosphocholine
40. 17-octadecenyl-1-phosphocholine

19 chain carbon atoms

$C_{24}H_{50}NO_4P$ (447.64)

41. (Z)-3-nonadecenyl-1-phosphocholine
42. (Z)-4-nonadecenyl-1-phosphocholine
43. (Z)-5-nonadecenyl-1-phosphocholine
44. (Z)-6-nonadecenyl-1-phosphocholine
45. (Z)-7-nonadecenyl-1-phosphocholine
46. (Z)-8-nonadecenyl-1-phosphocholine
47. (Z)-9-nonadecenyl-1-phosphocholine
48. (Z)-10-nonadecenyl-1-phosphocholine
49. (Z)-11-nonadecenyl-1-phosphocholine
50. (Z)-12-nonadecenyl-1-phosphocholine
51. (Z)-13-nonadecenyl-1-phosphocholine
52. (Z)-14-nonadecenyl-1-phosphocholine
53. (Z)-15-nonadecenyl-1-phosphocholine
54. (Z)-16-nonadecenyl-1-phosphocholine
55. (Z)-17-nonadecenyl-1-phosphocholine
56. 18-nonadecenyl-1-phosphocholine

20 chain carbon atoms

$C_{25}H_{52}NO_4P$ (461.67)

57. (Z)-3-eicosenyl-1-phosphocholine
58. (Z)-4-eicosenyl-1-phosphocholine
59. (Z)-5-eicosenyl-1-phosphocholine
60. (Z)-6-eicosenyl-1-phosphocholine
61. (Z)-7-eicosenyl-1-phosphocholine
62. (Z)-8-eicosenyl-1-phosphocholine

63. (Z)-9-eicosenyl-1-phosphocholine
64. (Z)-10-eicosenyl-1-phosphocholine
65. (Z)-12-eicosenyl-1-phosphocholine
66. (Z)-13-eicosenyl-1-phosphocholine
67. (Z)-14-eicosenyl-1-phosphocholine
68. (Z)-15-eicosenyl-1-phosphocholine
69. (Z)-16-eicosenyl-1-phosphocholine
70. (Z)-17-eicosenyl-1-phosphocholine
71. (Z)-18-eicosenyl-1-phosphocholine
72. 19-eicosenyl-1-phosphocholine

21 chain carbon atoms

$C_{26}H_{54}NO_4P$ (475.69)

73. (Z)-3-heneicosenyl-1-phosphocholine
74. (Z)-4-heneicosenyl-1-phosphocholine
75. (Z)-5-heneicosenyl-1-phosphocholine
76. (Z)-6-heneicosenyl-1-phosphocholine
77. (Z)-7-heneicosenyl-1-phosphocholine
78. (Z)-8-heneicosenyl-1-phosphocholine
79. (Z)-9-heneicosenyl-1-phosphocholine
80. (Z)-10-heneicosenyl-1-phosphocholine
81. (Z)-11-heneicosenyl-1-phosphocholine
82. (Z)-12-heneicosenyl-1-phosphocholine
83. (Z)-13-heneicosenyl-1-phosphocholine
84. (Z)-14-heneicosenyl-1-phosphocholine
85. (Z)-15-heneicosenyl-1-phosphocholine
86. (Z)-16-heneicosenyl-1-phosphocholine
87. (Z)-17-heneicosenyl-1-phosphocholine
88. (Z)-18-heneicosenyl-1-phosphocholine
89. (Z)-19-heneicosenyl-1-phosphocholine
90. 20-heneicosenyl-1-phosphocholine

22 chain carbon atoms

$C_{27}H_{56}NO_4P$ (489.72)

91. (Z)-3-docosenyl-1-phosphocholine
92. (Z)-4-docosenyl-1-phosphocholine
93. (Z)-5-docosenyl-1-phosphocholine
94. (Z)-6-docosenyl-1-phosphocholine
95. (Z)-7-docosenyl-1-phosphocholine
96. (Z)-8-docosenyl-1-phosphocholine
97. (Z)-9-docosenyl-1-phosphocholine
98. (Z)-10-docosenyl-1-phosphocholine
99. (Z)-11-docosenyl-1-phosphocholine
100. (Z)-12-docosenyl-1-phosphocholine
101. (Z)-14-docosenyl-1-phosphocholine
102. (Z)-15-docosenyl-1-phosphocholine
103. (Z)-16-docosenyl-1-phosphocholine
104. (Z)-17-docosenyl-1-phosphocholine
105. (Z)-18-docosenyl-1-phosphocholine
106. (Z)-19-docosenyl-1-phosphocholine
107. (Z)-20-docosenyl-1-phosphocholine
108. 21-docosenyl-1-phosphocholine

23 chain carbon atoms

$C_{28}H_{58}NO_4P$ (503.75)

109. (Z)-3-tricosenyl-1-phosphocholine
110. (Z)-4-tricosenyl-1-phosphocholine
111. (Z)-5-tricosenyl-1-phosphocholine
112. (Z)-6-tricosenyl-1-phosphocholine
113. (Z)-7-tricosenyl-1-phosphocholine
114. (Z)-8-tricosenyl-1-phosphocholine
115. (Z)-9-tricosenyl-1-phosphocholine
116. (Z)-10-tricosenyl-1-phosphocholine
117. (Z)-11-tricosenyl-1-phosphocholine
118. (Z)-12-tricosenyl-1-phosphocholine
119. (Z)-13-tricosenyl-1-phosphocholine

120. (Z)-14-tricosenyl-1-phosphocholine
121. (Z)-15-tricosenyl-1-phosphocholine
122. (Z)-16-tricosenyl-1-phosphocholine
123. (Z)-17-tricosenyl-1-phosphocholine
124. (Z)-18-tricosenyl-1-phosphocholine
125. (Z)-19-tricosenyl-1-phosphocholine
126. (Z)-20-tricosenyl-1-phosphocholine
127. (Z)-21-tricosenyl-1-phosphocholine
128. 22-tricosenyl-1-phosphocholine

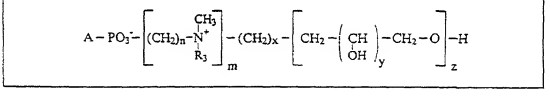
24 chain carbon atoms

$C_{29}H_{60}NO_4P$ (517.77)

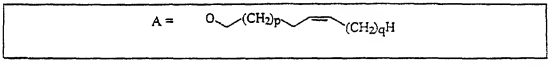
129. (Z)-3-tetracosenyl-1-phosphocholine
130. (Z)-4-tetracosenyl-1-phosphocholine
131. (Z)-5-tetracosenyl-1-phosphocholine
132 (Z)-6-tetracosenyl-1-phosphocholine
133. (Z)-7-tetracosenyl-1-phosphocholine
134. (Z)-8-tetracosenyl-1-phosphocholine
135. (Z)-9-tetracosenyl-1-phosphocholine
136. (Z)-10-tetracosenyl-1-phosphocholine
137. (Z)-11-tetracosenyl-1-phosphocholine
138. (Z)-12-tetracosenyl-1-phosphocholine
139. (Z)-13-tetracosenyl-1-phosphocholine
140. (Z)-14-tetracosenyl-1-phosphocholine
141. (Z)-16-tetracosenyl-1-phosphocholine
142. (Z)-17-tetracosenyl-1-phosphocholine
143. (Z)-18-tetracosenyl-1-phosphocholine

2. Examples of (Z)-alkenyl-1-phospho-N,N,N-trimethyl-propylammonium compounds

(A = VIII; n = 3; R_3, CH_3; m = 1, x = 1; z = 0)



where A is a monounsaturated alkyl chain of the following structure ($p,q \geq 0$; $12 \leq p+q \leq 30$):



formula VIII

16 chain carbon atoms

$C_{22}H_{46}NO_4P$ (419.59)

144. (Z)-3-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
145. (Z)-4-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
146. (Z)-5-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
147. (Z)-6-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
148. (Z)-7-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
149. (Z)-8-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
150. (Z)-9-hexadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
151. (Z)-10-hexadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
152. (Z)-11-hexadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
153. (Z)-12-hexadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
154. (Z)-13-hexadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
155. (Z)-14-hexadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
156. 15-hexadecenyl-1-phospho-N,N,N-trimethyl-propylammonium

17 chain carbon atoms

$C_{23}H_{48}NO_4P$ (433.61)

157. (Z)-3-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
158. (Z)-4-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
159. (Z)-5-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
160. (Z)-6-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
161. (Z)-7-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
162. (Z)-8-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
163. (Z)-9-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
164. (Z)-10-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
165. (Z)-11-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
166. (Z)-12-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
167. (Z)-13-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
168. (Z)-14-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
169. (Z)-15-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
170. 16-heptadecenyl-1-phospho-N,N,N-trimethyl-propylammonium

18 chain carbon atoms

$C_{24}H_{50}NO_4P$ (447.64)

171. (Z)-3-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
172. (Z)-4-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
173. (Z)-5-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
174. (Z)-6-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
175. (Z)-7-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
176. (Z)-8-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
177. (Z)-10-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
178. (Z)-11-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
179. (Z)-12-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
180. (Z)-13-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
181. (Z)-14-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
182. (Z)-15-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
183. (Z)-16-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
184. 17-octadecenyl-1-phospho-N,N,N-trimethyl-propylammonium

19 chain carbon atoms

$C_{25}H_{52}NO_4P$ (461.67)

185. (Z)-3-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
186. (Z)-4-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
187. (Z)-5-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
188. (Z)-6-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
189. (Z)-7-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
190. (Z)-8-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
191. (Z)-9-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
192. (Z)-10-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
193. (Z)-11-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
194. (Z)-12-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
195. (Z)-13-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
196. (Z)-14-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
197. (Z)-15-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
198. (Z)-16-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
199. (Z)-17-nonadecenyl-1-phospho-N,N,N-trimethyl-propylammonium
200. 18-nonadecenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

20 chain carbon atoms

$C_{26}H_{54}NO_4P$ (475.69)

201. (Z)-3-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
202. (Z)-4-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
203. (Z)-5-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
204. (Z)-6-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
205. (Z)-7-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
206. (Z)-8-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
207. (Z)-9-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
208. (Z)-10-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
209. (Z)-12-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
210. (Z)-13-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
211. (Z)-14-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
212. (Z)-15-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
213. (Z)-16-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
214. (Z)-17-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
215. (Z)-18-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
216. 19-eicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

21 chain carbon atoms

$C_{27}H_{56}NO_4P$ (489.72)

217. (Z)-3-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
218. (Z)-4-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
219. (Z)-5-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
220. (Z)-6-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
221. (Z)-7-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
222. (Z)-8-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
223. (Z)-9-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
224. (Z)-10-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
225. (Z)-11-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
226. (Z)-12-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
227. (Z)-13-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
228. (Z)-14-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
229. (Z)-15-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
230. (Z)-16-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
231. (Z)-17-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
232. (Z)-18-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium
233. (Z)-19-heneicosenyl-1-phospho-N,N,N-trimethyl-propylammonium

234. 20-heneicosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

22 chain carbon atoms

$C_{28}H_{58}NO_4P$ (503.75)

235. (Z)-3-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
236. (Z)-4-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
237. (Z)-5-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
238. (Z)-6-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
239. (Z)-7-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
240. (Z)-8-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
241. (Z)-9-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
242. (Z)-10-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
243. (Z)-11-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
244. (Z)-12-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
245. (Z)-14-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
246. (Z)-15-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
247. (Z)-16-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
248. (Z)-17-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
249. (Z)-18-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

250. (Z)-19-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
251. (Z)-20-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
252. 21-docosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

23 chain carbon atoms

$C_{29}H_{60}NO_4P$ (517.77)

253. (Z)-3-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
254. (Z)-4-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
255. (Z)-5-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
256. (Z)-6-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
257. (Z)-7-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
258. (Z)-8-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
259. (Z)-9-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
260. (Z)-10-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
261. (Z)-11-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
262. (Z)-12-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
263. (Z)-13-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
264. (Z)-14-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
265. (Z)-15-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

266. (Z)-16-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
267. (Z)-17-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
268. (Z)-18-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
269. (Z)-19-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
270. (Z)-20-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
271. (Z)-21-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium
272. 22-tricosenyl-1-phospho-N,N,N-trimethylpropyl-ammonium

24 chain carbon atoms

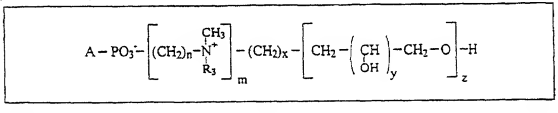
$C_{30}H_{62}NO_4P$ (531.80)

273. (Z)-3-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
274. (Z)-4-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
275. (Z)-5-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
276. (Z)-6-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
277. (Z)-7-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
278. (Z)-8-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
279. (Z)-9-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
280. (Z)-10-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
281. (Z)-11-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium

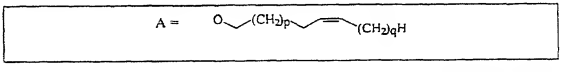
282. (Z)-12-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
283. (Z)-13-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
284. (Z)-14-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
285. (Z)-15-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
286. (Z)-16-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
287. (Z)-17-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium
288. (Z)-18-tetracosenyl-1-phospho-N,N,N-trimethyl-propylammonium

3. Examples of (Z)-alkenyl-1-phospho-N,N,N-trimethyl-butylammonium compounds

(A = VIII; n = 4; R_3, CH_3; m = 1, x = 1; z = 0)



where A is a monounsaturated alkyl chain of the following structure (p,q ≥ 0; 12 ≤ p+q ≤ 30):



formula VIII

16 chain carbon atoms

$C_{23}H_{48}NO_4P$ (433.61)

289. (Z)-3-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
290. (Z)-4-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

291. (Z)-5-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
292. (Z)-6-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
293. (Z)-7-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
294. (Z)-8-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
295. (Z)-9-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
296. (Z)-10-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
297. (Z)-11-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
298. (Z)-12-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
299. (Z)-13-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
300. (Z)-14-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
301. 15-hexadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

17 chain carbon atoms

$C_{24}H_{50}NO_4P$ (447.64)

302. (Z)-3-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
303. (Z)-4-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
304. (Z)-5-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
305. (Z)-6-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
306. (Z)-7-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

307. (Z)-8-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
308. (Z)-9-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
309. (Z)-10-heptadecenyl-1-phospho-N,N,N-trimethylbutylammonium
310. (Z)-11-heptadecenyl-1-phospho-N,N,N-trimethylbutylammonium
311. (Z)-12-heptadecenyl-1-phospho-N,N,N-trimethylbutylammonium
312. (Z)-13-heptadecenyl-1-phospho-N,N,N-trimethylbutylammonium
313. (Z)-14-heptadecenyl-1-phospho-N,N,N-trimethylbutylammonium
314. (Z)-15-heptadecenyl-1-phospho-N,N,N-trimethylbutylammonium
315. 16-heptadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

18 chain carbon atoms

$C_{25}H_{52}NO_4P$ (461.67)

316. (Z)-3-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
317. (Z)-4-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
318. (Z)-5-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
319. (Z)-6-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
320. (Z)-7-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
321. (Z)-8-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
322. (Z)-10-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

323. (Z)-11-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
324. (Z)-12-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
325. (Z)-13-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
326. (Z)-14-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
327. (Z)-15-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
328. (Z)-16-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
329. 17-octadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

19 chain carbon atoms

$C_{26}H_{54}NO_4P$ (475.69)

330. (Z)-3-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
331. (Z)-4-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
332. (Z)-5-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
333. (Z)-6-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
334. (Z)-7-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
335. (Z)-8-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
336. (Z)-9-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
337. (Z)-10-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
338. (Z)-11-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

339. (Z)-12-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
340. (Z)-13-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
341. (Z)-14-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
342. (Z)-15-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
343. (Z)-16-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
344. (Z)-17-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
345. 18-nonadecenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

20 chain carbon atoms

$C_{27}H_{56}NO_4P$ (489.72)

346. (Z)-3-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
347. (Z)-4-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
348. (Z)-5-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
349. (Z)-6-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
350. (Z)-7-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
351. (Z)-8-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
352. (Z)-9-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
353. (Z)-10-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
354. (Z)-11-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

355. (Z)-12-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
356. (Z)-13-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
357. (Z)-14-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
358. (Z)-15-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
359. (Z)-16-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
360. (Z)-17-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
361. (Z)-18-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
362. 19-eicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

21 chain carbon atoms

$C_{28}H_{58}NO_4P$ (503.75)

363. (Z)-3-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
364. (Z)-4-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
365. (Z)-5-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
366. (Z)-6-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
367. (Z)-7-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
368. (Z)-8-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
369. (Z)-9-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
370. (Z)-10-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium

371. (Z)-11-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
372. (Z)-12-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
373. (Z)-13-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
374. (Z)-14-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
375. (Z)-15-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
376. (Z)-16-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
377. (Z)-17-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
378. (Z)-18-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
379. (Z)-19-heneicosenyl-1-phospho-N,N,N-trimethyl-butylammonium
380. 20-heneicosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

22 chain carbon atoms

$C_{29}H_{60}NO_4P$ (517.77)

381. (Z)-3-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
382. (Z)-4-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
383. (Z)-5-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
384. (Z)-6-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
385. (Z)-7-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
386. (Z)-8-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

387. (Z)-9-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
388. (Z)-10-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
389. (Z)-11-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
390. (Z)-12-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
391. (Z)-14-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
392. (Z)-15-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
393. (Z)-16-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
394. (Z)-17-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
395. (Z)-18-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
396. (Z)-19-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
397. (Z)-20-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
398. 21-docosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

23 chain carbon atoms

$C_{30}H_{62}NO_4P$ (531.80)

399. (Z)-3-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
400. (Z)-4-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
401. (Z)-5-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
402. (Z)-6-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

403. (Z)-7-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
404. (Z)-8-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
405. (Z)-9-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
406. (Z)-10-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
407. (Z)-11-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
408. (Z)-12-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
409. (Z)-13-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
410. (Z)-14-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
411. (Z)-15-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
412. (Z)-16-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
413. (Z)-17-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
414. (Z)-18-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
415. (Z)-19-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
416. (Z)-20-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
417. (Z)-21-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
418. 22-tricosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium

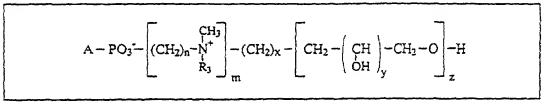
24 chain carbon atoms

$C_{31}H_{64}NO_4P$ (545.83)

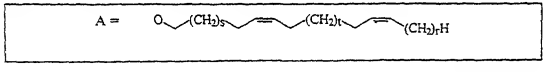
419. (Z)-3-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
420. (Z)-4-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
421. (Z)-5-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
422. (Z)-6-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
423. (Z)-7-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
424. (Z)-8-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
425. (Z)-9-tetracosenyl-1-phospho-N,N,N-trimethylbutyl-ammonium
426. (Z)-10-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
427. (Z)-11-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
428. (Z)-12-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
429. (Z)-13-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
430. (Z)-14-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
431. (Z)-15-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
432. (Z)-16-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
433. (Z)-17-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium
434. (Z)-18-tetracosenyl-1-phospho-N,N,N-trimethyl-butylammonium

4. Examples of (Z,Z)-alkadienylphosphocholines

(A = IX; n = 2; R_3, CH_3; m = 1, x = 1, z = 0)



where A is a diunsaturated alkyl chain of the following structure (s, t, r ≥ 0; 8 ≤ s + t + r ≤ 26):



formula IX

16 chain carbon atoms

$C_{21}H_{42}NO_4P$ (403.54)

435. (Z,Z)-3,7-hexadecadienyl-1-phosphocholine
436. (Z,Z)-4,8-hexadecadienyl-1-phosphocholine
437. (Z,Z)-5,9-hexadecadienyl-1-phosphocholine
438. (Z,Z)-6,10-hexadecadienyl-1-phosphocholine
439. (Z,Z)-7,11-hexadecadienyl-1-phosphocholine
440. (Z,Z)-8,12-hexadecadienyl-1-phosphocholine
441. (Z,Z)-9,13-hexadecadienyl-1-phosphocholine

442. (Z,Z)-3,8-hexadecadienyl-1-phosphocholine
443. (Z,Z)-4,9-hexadecadienyl-1-phosphocholine
444. (Z,Z)-5,10-hexadecadienyl-1-phosphocholine
445. (Z,Z)-6,11-hexadecadienyl-1-phosphocholine
446. (Z,Z)-7,12-hexadecadienyl-1-phosphocholine
447. (Z,Z)-8,13-hexadecadienyl-1-phosphocholine

448. (Z,Z)-3,9-hexadecadienyl-1-phosphocholine
449. (Z,Z)-4,10-hexadecadienyl-1-phosphocholine
450. (Z,Z)-5,11-hexadecadienyl-1-phosphocholine
451. (Z,Z)-6,12-hexadecadienyl-1-phosphocholine
452. (Z,Z)-7,13-hexadecadienyl-1-phosphocholine

453. (Z,Z)-3,10-hexadecadienyl-1-phosphocholine
454. (Z,Z)-4,11-hexadecadienyl-1-phosphocholine
455. (Z,Z)-5,12-hexadecadienyl-1-phosphocholine
456. (Z,Z)-6,13-hexadecadienyl-1-phosphocholine

457. (Z,Z)-3,11-hexadecadienyl-1-phosphocholine
458. (Z,Z)-4,12-hexadecadienyl-1-phosphocholine
459. (Z,Z)-5,13-hexadecadienyl-1-phosphocholine

460. (Z,Z)-3,12-hexadecadienyl-1-phosphocholine
461. (Z,Z)-4,13-hexadecadienyl-1-phosphocholine

462. (Z,Z)-3,13-hexadecadienyl-1-phosphocholine

17 chain carbon atoms

$C_{22}H_{44}NO_4P$ (417.57)

463. (Z,Z)-3,7-heptadecadienyl-1-phosphocholine
464. (Z,Z)-4,8-heptadecadienyl-1-phosphocholine
465. (Z,Z)-5,9-heptadecadienyl-1-phosphocholine
466. (Z,Z)-6,10-heptadecadienyl-1-phosphocholine
467. (Z,Z)-7,11-heptadecadienyl-1-phosphocholine
468. (Z,Z)-8,12-heptadecadienyl-1-phosphocholine
469. (Z,Z)-9,13-heptadecadienyl-1-phosphocholine
470. (Z,Z)-10,14-heptadecadienyl-1-phosphocholine

471. (Z,Z)-3,8-heptadecadienyl-1-phosphocholine
472. (Z,Z)-4,9-heptadecadienyl-1-phosphocholine
473. (Z,Z)-5,10-heptadecadienyl-1-phosphocholine
474. (Z,Z)-6,11-heptadecadienyl-1-phosphocholine
475. (Z,Z)-7,12-heptadecadienyl-1-phosphocholine
476. (Z,Z)-8,13-heptadecadienyl-1-phosphocholine
477. (Z,Z)-9,14-heptadecadienyl-1-phosphocholine

478. (Z,Z)-3,9-heptadecadienyl-1-phosphocholine
479. (Z,Z)-4,10-heptadecadienyl-1-phosphocholine

480. (Z,Z)-5,11-heptadecadienyl-1-phosphocholine
481. (Z,Z)-6,12-heptadecadienyl-1-phosphocholine
482. (Z,Z)-7,13-heptadecadienyl-1-phosphocholine
483. (Z,Z)-8,14-heptadecadienyl-1-phosphocholine

484. (Z,Z)-3,10-heptadecadienyl-1-phosphocholine
485. (Z,Z)-4,11-heptadecadienyl-1-phosphocholine
486. (Z,Z)-5,12-heptadecadienyl-1-phosphocholine
487. (Z,Z)-6,13-heptadecadienyl-1-phosphocholine
488. (Z,Z)-7,14-heptadecadienyl-1-phosphocholine

489. (Z,Z)-3,11-heptadecadienyl-1-phosphocholine
490. (Z,Z)-4,12-heptadecadienyl-1-phosphocholine
491. (Z,Z)-5,13-heptadecadienyl-1-phosphocholine
492. (Z,Z)-6,14-heptadecadienyl-1-phosphocholine

493. (Z,Z)-3,12-heptadecadienyl-1-phosphocholine
494. (Z,Z)-4,13-heptadecadienyl-1-phosphocholine
495. (Z,Z)-5,14-heptadecadienyl-1-phosphocholine

496. (Z,Z)-3,13-heptadecadienyl-1-phosphocholine
497. (Z,Z)-4,14-heptadecadienyl-1-phosphocholine

498. (Z,Z)-3,14-heptadecadienyl-1-phosphocholine

18 chain carbon atoms

$C_{23}H_{46}NO_4P$ (431.60)

499. (Z,Z)-3,7-octadecadienyl-1-phosphocholine
500. (Z,Z)-4,8-octadecadienyl-1-phosphocholine
501. (Z,Z)-5,9-octadecadienyl-1-phosphocholine
502. (Z,Z)-6,10-octadecadienyl-1-phosphocholine
503. (Z,Z)-7,11-octadecadienyl-1-phosphocholine
504. (Z,Z)-8,12-octadecadienyl-1-phosphocholine
505. (Z,Z)-9,13-octadecadienyl-1-phosphocholine
506. (Z,Z)-10,14-octadecadienyl-1-phosphocholine
507. (Z,Z)-11,15-octadecadienyl-1-phosphocholine

508. (Z,Z)-3,8-octadecadienyl-1-phosphocholine
509. (Z,Z)-4,9-octadecadienyl-1-phosphocholine
510. (Z,Z)-5,10-octadecadienyl-1-phosphocholine
511. (Z,Z)-6,11-octadecadienyl-1-phosphocholine
512. (Z,Z)-7,12-octadecadienyl-1-phosphocholine
513. (Z,Z)-8,13-octadecadienyl-1-phosphocholine
514. (Z,Z)-9,14-octadecadienyl-1-phosphocholine
515. (Z,Z)-10,15-octadecadienyl-1-phosphocholine

516. (Z,Z)-3,9-octadecadienyl-1-phosphocholine
517. (Z,Z)-4,10-octadecadienyl-1-phosphocholine
518. (Z,Z)-5,11-octadecadienyl-1-phosphocholine
519. (Z,Z)-6,12-octadecadienyl-1-phosphocholine
520. (Z,Z)-7,13-octadecadienyl-1-phosphocholine
521. (Z,Z)-8,14-octadecadienyl-1-phosphocholine
522. (Z,Z)-9,15-octadecadienyl-1-phosphocholine

523. (Z,Z)-3,10-octadecadienyl-1-phosphocholine
524. (Z,Z)-4,11-octadecadienyl-1-phosphocholine
525. (Z,Z)-5,12-octadecadienyl-1-phosphocholine
526. (Z,Z)-6,13-octadecadienyl-1-phosphocholine
527. (Z,Z)-7,14-octadecadienyl-1-phosphocholine
528. (Z,Z)-8,15-octadecadienyl-1-phosphocholine

529. (Z,Z)-3,11-octadecadienyl-1-phosphocholine
530. (Z,Z)-4,12-octadecadienyl-1-phosphocholine
531. (Z,Z)-5,13-octadecadienyl-1-phosphocholine
532. (Z,Z)-6,14-octadecadienyl-1-phosphocholine
533. (Z,Z)-7,15-octadecadienyl-1-phosphocholine

534. (Z,Z)-3,12-octadecadienyl-1-phosphocholine
535. (Z,Z)-4,13-octadecadienyl-1-phosphocholine
536. (Z,Z)-5,14-octadecadienyl-1-phosphocholine
537. (Z,Z)-6,15-octadecadienyl-1-phosphocholine

538. (Z,Z)-3,13-octadecadienyl-1-phosphocholine
539. (Z,Z)-4,14-octadecadienyl-1-phosphocholine

540. (Z,Z)-5,15-octadecadienyl-1-phosphocholine

541. (Z,Z)-3,14-octadecadienyl-1-phosphocholine
542. (Z,Z)-4,15-octadecadienyl-1-phosphocholine

543. (Z,Z)-3,15-octadecadienyl-1-phosphocholine

19 chain carbon atoms

$C_{24}H_{48}NO_4P$ (445.62)

544. (Z,Z)-3,7-nonadecadienyl-1-phosphocholine
545. (Z,Z)-4,8-nonadecadienyl-1-phosphocholine
546. (Z,Z)-5,9-nonadecadienyl-1-phosphocholine
547. (Z,Z)-6,10-nonadecadienyl-1-phosphocholine
548. (Z,Z)-7,11-nonadecadienyl-1-phosphocholine
549. (Z,Z)-8,12-nonadecadienyl-1-phosphocholine
550. (Z,Z)-9,13-nonadecadienyl-1-phosphocholine
551. (Z,Z)-10,14-nonadecadienyl-1-phosphocholine
552. (Z,Z)-11,15-nonadecadienyl-1-phosphocholine
553. (Z,Z)-12,16-nonadecadienyl-1-phosphocholine

554. (Z,Z)-3,8-nonadecadienyl-1-phosphocholine
555. (Z,Z)-4,9-nonadecadienyl-1-phosphocholine
556. (Z,Z)-5,10-nonadecadienyl-1-phosphocholine
557. (Z,Z)-6,11-nonadecadienyl-1-phosphocholine
558. (Z,Z)-7,12-nonadecadienyl-1-phosphocholine
559. (Z,Z)-8,13-nonadecadienyl-1-phosphocholine
560. (Z,Z)-9,14-nonadecadienyl-1-phosphocholine
561. (Z,Z)-10,15-nonadecadienyl-1-phosphocholine
562. (Z,Z)-11,16-nonadecadienyl-1-phosphocholine

563. (Z,Z)-3,9-nonadecadienyl-1-phosphocholine
564. (Z,Z)-4,10-nonadecadienyl-1-phosphocholine
565. (Z,Z)-5,11-nonadecadienyl-1-phosphocholine
566. (Z,Z)-6,12-nonadecadienyl-1-phosphocholine
567. (Z,Z)-7,13-nonadecadienyl-1-phosphocholine
568. (Z,Z)-8,14-nonadecadienyl-1-phosphocholine

569. (Z,Z)-9,15-nonadecadienyl-1-phosphocholine
570. (Z,Z)-10,16-nonadecadienyl-1-phosphocholine

571. (Z,Z)-3,10-nonadecadienyl-1-phosphocholine
572. (Z,Z)-4,11-nonadecadienyl-1-phosphocholine
573. (Z,Z)-5,12-nonadecadienyl-1-phosphocholine
574. (Z,Z)-6,13-nonadecadienyl-1-phosphocholine
575. (Z,Z)-7,14-nonadecadienyl-1-phosphocholine
576. (Z,Z)-8,15-nonadecadienyl-1-phosphocholine
577. (Z,Z)-9,16-nonadecadienyl-1-phosphocholine

578. (Z,Z)-3,11-nonadecadienyl-1-phosphocholine
579. (Z,Z)-4,12-nonadecadienyl-1-phosphocholine
580. (Z,Z)-5,13-nonadecadienyl-1-phosphocholine
581. (Z,Z)-6,14-nonadecadienyl-1-phosphocholine
582. (Z,Z)-7,15-nonadecadienyl-1-phosphocholine
583. (Z,Z)-8,16-nonadecadienyl-1-phosphocholine

584. (Z,Z)-3,12-nonadecadienyl-1-phosphocholine
585. (Z,Z)-4,13-nonadecadienyl-1-phosphocholine
586. (Z,Z)-5,14-nonadecadienyl-1-phosphocholine
587. (Z,Z)-6,15-nonadecadienyl-1-phosphocholine
588. (Z,Z)-7,16-nonadecadienyl-1-phosphocholine

589. (Z,Z)-3,13-nonadecadienyl-1-phosphocholine
590. (Z,Z)-4,14-nonadecadienyl-1-phosphocholine
591. (Z,Z)-5,15-nonadecadienyl-1-phosphocholine
592. (Z,Z)-6,16-nonadecadienyl-1-phosphocholine

593. (Z,Z)-3,14-nonadecadienyl-1-phosphocholine
594. (Z,Z)-4,15-nonadecadienyl-1-phosphocholine
595. (Z,Z)-5,16-nonadecadienyl-1-phosphocholine

596. (Z,Z)-3,15-nonadecadienyl-1-phosphocholine
597. (Z,Z)-4,16-nonadecadienyl-1-phosphocholine

20 chain carbon atoms

$C_{25}H_{50}NO_4P$ (459.65)

598. (Z,Z)-3,7-eicosadienyl-1-phosphocholine
599. (Z,Z)-4,8-eicosadienyl-1-phosphocholine
600. (Z,Z)-5,9-eicosadienyl-1-phosphocholine
601. (Z,Z)-6,10-eicosadienyl-1-phosphocholine
602. (Z,Z)-7,11-eicosadienyl-1-phosphocholine
603. (Z,Z)-8,12-eicosadienyl-1-phosphocholine
604. (Z,Z)-9,13-eicosadienyl-1-phosphocholine
605. (Z,Z)-10,14-eicosadienyl-1-phosphocholine
606. (Z,Z)-11,15-eicosadienyl-1-phosphocholine
607. (Z,Z)-12,16-eicosadienyl-1-phosphocholine
608. (Z,Z)-13,17-eicosadienyl-1-phosphocholine

609. (Z,Z)-3,8-eicosadienyl-1-phosphocholine
610. (Z,Z)-4,9-eicosadienyl-1-phosphocholine
611. (Z,Z)-5,10-eicosadienyl-1-phosphocholine
612. (Z,Z)-6,11-eicosadienyl-1-phosphocholine
613. (Z,Z)-7,12-eicosadienyl-1-phosphocholine
614. (Z,Z)-8,13-eicosadienyl-1-phosphocholine
615. (Z,Z)-9,14-eicosadienyl-1-phosphocholine
616. (Z,Z)-10,15-eicosadienyl-1-phosphocholine
617. (Z,Z)-11,16-eicosadienyl-1-phosphocholine
618. (Z,Z)-12,17-eicosadienyl-1-phosphocholine

619. (Z,Z)-3,9-eicosadienyl-1-phosphocholine
620. (Z,Z)-4,10-eicosadienyl-1-phosphocholine
621. (Z,Z)-5,11-eicosadienyl-1-phosphocholine
622. (Z,Z)-6,12-eicosadienyl-1-phosphocholine
623. (Z,Z)-7,13-eicosadienyl-1-phosphocholine
624. (Z,Z)-8,14-eicosadienyl-1-phosphocholine
625. (Z,Z)-9,15-eicosadienyl-1-phosphocholine
626. (Z,Z)-10,16-eicosadienyl-1-phosphocholine
627. (Z,Z)-11,17-eicosadienyl-1-phosphocholine

628. (Z,Z)-3,10-eicosadienyl-1-phosphocholine

629. (Z,Z)-4,11-eicosadienyl-1-phosphocholine
630. (Z,Z)-5,12-eicosadienyl-1-phosphocholine
631. (Z,Z)-6,13-eicosadienyl-1-phosphocholine
632. (Z,Z)-7,14-eicosadienyl-1-phosphocholine
633. (Z,Z)-8,15-eicosadienyl-1-phosphocholine
634. (Z,Z)-9,16-eicosadienyl-1-phosphocholine
635. (Z,Z)-10,17-eicosadienyl-1-phosphocholine

636. (Z,Z)-3,11-eicosadienyl-1-phosphocholine
637. (Z,Z)-4,12-eicosadienyl-1-phosphocholine
638. (Z,Z)-5,13-eicosadienyl-1-phosphocholine
639. (Z,Z)-6,14-eicosadienyl-1-phosphocholine
640. (Z,Z)-7,15-eicosadienyl-1-phosphocholine
641. (Z,Z)-8,16-eicosadienyl-1-phosphocholine
642. (Z,Z)-9,17-eicosadienyl-1-phosphocholine

643. (Z,Z)-3,12-eicosadienyl-1-phosphocholine
644. (Z,Z)-4,13-eicosadienyl-1-phosphocholine
645. (Z,Z)-5,14-eicosadienyl-1-phosphocholine
646. (Z,Z)-6,15-eicosadienyl-1-phosphocholine
647. (Z,Z)-7,16-eicosadienyl-1-phosphocholine
648. (Z,Z)-8,17-eicosadienyl-1-phosphocholine

649. (Z,Z)-3,13-eicosadienyl-1-phosphocholine
650. (Z,Z)-4,14-eicosadienyl-1-phosphocholine
651. (Z,Z)-5,15-eicosadienyl-1-phosphocholine
652. (Z,Z)-6,16-eicosadienyl-1-phosphocholine
653. (Z,Z)-7,17-eicosadienyl-1-phosphocholine

654. (Z,Z)-3,14-eicosadienyl-1-phosphocholine
655. (Z,Z)-4,15-eicosadienyl-1-phosphocholine
656. (Z,Z)-5,16-eicosadienyl-1-phosphocholine
657. (Z,Z)-6,17-eicosadienyl-1-phosphocholine

658. (Z,Z)-3,15-eicosadienyl-1-phosphocholine
659. (Z,Z)-4,16-eicosadienyl-1-phosphocholine
660. (Z,Z)-5,17-eicosadienyl-1-phosphocholine

661. (Z,Z)-3,17-eicosadienyl-1-phosphocholine

21 chain carbon atoms

$C_{26}H_{52}NO_4P$ (473.68)

662. (Z,Z)-3,7-heneicosadienyl-1-phosphocholine
663. (Z,Z)-4,8-heneicosadienyl-1-phosphocholine
664. (Z,Z)-5,9-heneicosadienyl-1-phosphocholine
665. (Z,Z)-6,10-heneicosadienyl-1-phosphocholine
666. (Z,Z)-7,11-heneicosadienyl-1-phosphocholine
667. (Z,Z)-8,12-heneicosadienyl-1-phosphocholine
668. (Z,Z)-9,13-heneicosadienyl-1-phosphocholine
669. (Z,Z)-10,14-heneicosadienyl-1-phosphocholine
670. (Z,Z)-11,15-heneicosadienyl-1-phosphocholine
671. (Z,Z)-12,16-heneicosadienyl-1-phosphocholine
672. (Z,Z)-13,17-heneicosadienyl-1-phosphocholine
673. (Z,Z)-14,18-heneicosadienyl-1-phosphocholine

674. (Z,Z)-3,8-heneicosadienyl-1-phosphocholine
675. (Z,Z)-4,9-heneicosadienyl-1-phosphocholine
676. (Z,Z)-5,10-heneicosadienyl-1-phosphocholine
677. (Z,Z)-6,11-heneicosadienyl-1-phosphocholine
678. (Z,Z)-7,12-heneicosadienyl-1-phosphocholine
679. (Z,Z)-8,13-heneicosadienyl-1-phosphocholine
680. (Z,Z)-9,14-heneicosadienyl-1-phosphocholine
681. (Z,Z)-10,15-heneicosadienyl-1-phosphocholine
682. (Z,Z)-11,16-heneicosadienyl-1-phosphocholine
683. (Z,Z)-12,17-heneicosadienyl-1-phosphocholine
684. (Z,Z)-13,18-heneicosadienyl-1-phosphocholine

685. (Z,Z)-3,9-heneicosadienyl-1-phosphocholine
686. (Z,Z)-4,10-heneicosadienyl-1-phosphocholine
687. (Z,Z)-5,11-heneicosadienyl-1-phosphocholine
688. (Z,Z)-6,12-heneicosadienyl-1-phosphocholine
689. (Z,Z)-7,13-heneicosadienyl-1-phosphocholine
690. (Z,Z)-8,14-heneicosadienyl-1-phosphocholine
691. (Z,Z)-9,15-heneicosadienyl-1-phosphocholine

692. (Z,Z)-10,16-heneicosadienyl-1-phosphocholine
693. (Z,Z)-11,17-heneicosadienyl-1-phosphocholine
694. (Z,Z)-12,18-heneicosadienyl-1-phosphocholine

695. (Z,Z)-3,10-heneicosadienyl-1-phosphocholine
696. (Z,Z)-4,11-heneicosadienyl-1-phosphocholine
697. (Z,Z)-5,12-heneicosadienyl-1-phosphocholine
698. (Z,Z)-6,13-heneicosadienyl-1-phosphocholine
699. (Z,Z)-7,14-heneicosadienyl-1-phosphocholine
700. (Z,Z)-8,15-heneicosadienyl-1-phosphocholine
701. (Z,Z)-9,16-heneicosadienyl-1-phosphocholine
702. (Z,Z)-10,17-heneicosadienyl-1-phosphocholine
703. (Z,Z)-11,18-heneicosadienyl-1-phosphocholine

704. (Z,Z)-3,11-heneicosadienyl-1-phosphocholine
705. (Z,Z)-4,12-heneicosadienyl-1-phosphocholine
706. (Z,Z)-5,13-heneicosadienyl-1-phosphocholine
707. (Z,Z)-6,14-heneicosadienyl-1-phosphocholine
708. (Z,Z)-7,15-heneicosadienyl-1-phosphocholine
709. (Z,Z)-8,16-heneicosadienyl-1-phosphocholine
710. (Z,Z)-9,17-heneicosadienyl-1-phosphocholine
711. (Z,Z)-10,18-heneicosadienyl-1-phosphocholine

712. (Z,Z)-3,12-heneicosadienyl-1-phosphocholine
713. (Z,Z)-4,13-heneicosadienyl-1-phosphocholine
714. (Z,Z)-5,14-heneicosadienyl-1-phosphocholine
715. (Z,Z)-6,15-heneicosadienyl-1-phosphocholine
716. (Z,Z)-7,16-heneicosadienyl-1-phosphocholine
717. (Z,Z)-8,17-heneicosadienyl-1-phosphocholine
718. (Z,Z)-9,18-heneicosadienyl-1-phosphocholine

719. (Z,Z)-3,13-heneicosadienyl-1-phosphocholine
720. (Z,Z)-4,14-heneicosadienyl-1-phosphocholine
721. (Z,Z)-5,15-heneicosadienyl-1-phosphocholine
722. (Z,Z)-6,16-heneicosadienyl-1-phosphocholine
723. (Z,Z)-7,17-heneicosadienyl-1-phosphocholine
724. (Z,Z)-8,18-heneicosadienyl-1-phosphocholine

725. (Z,Z)-3,14-heneicosadienyl-1-phosphocholine
726. (Z,Z)-4,15-heneicosadienyl-1-phosphocholine
727. (Z,Z)-5,16-heneicosadienyl-1-phosphocholine
728. (Z,Z)-6,17-heneicosadienyl-1-phosphocholine
729. (Z,Z)-7,18-heneicosadienyl-1-phosphocholine

730. (Z,Z)-3,15-heneicosadienyl-1-phosphocholine
731. (Z,Z)-4,16-heneicosadienyl-1-phosphocholine
732. (Z,Z)-5,17-heneicosadienyl-1-phosphocholine
733. (Z,Z)-6,18-heneicosadienyl-1-phosphocholine

734. (Z,Z)-3,17-heneicosadienyl-1-phosphocholine
735. (Z,Z)-4,18-heneicosadienyl-1-phosphocholine

22 chain carbon atoms

$C_{27}H_{54}NO_4P$ (487.70)

736. (Z,Z)-3,7-docosadienyl-1-phosphocholine
737. (Z,Z)-4,8-docosadienyl-1-phosphocholine
738. (Z,Z)-5,9-docosadienyl-1-phosphocholine
739. (Z,Z)-6,10-docosadienyl-1-phosphocholine
740. (Z,Z)-7,11-docosadienyl-1-phosphocholine
741. (Z,Z)-8,12-docosadienyl-1-phosphocholine
742. (Z,Z)-9,13-docosadienyl-1-phosphocholine
743. (Z,Z)-10,14-docosadienyl-1-phosphocholine
744. (Z,Z)-11,15-docosadienyl-1-phosphocholine
745. (Z,Z)-12,16-docosadienyl-1-phosphocholine
746. (Z,Z)-13,17-docosadienyl-1-phosphocholine
747. (Z,Z)-14,18-docosadienyl-1-phosphocholine
748. (Z,Z)-15,19-docosadienyl-1-phosphocholine

749. (Z,Z)-3,8-docosadienyl-1-phosphocholine
750. (Z,Z)-4,9-docosadienyl-1-phosphocholine
751. (Z,Z)-5,10-docosadienyl-1-phosphocholine
752. (Z,Z)-6,11-docosadienyl-1-phosphocholine
753. (Z,Z)-7,12-docosadienyl-1-phosphocholine
754. (Z,Z)-8,13-docosadienyl-1-phosphocholine

755. (Z,Z)-9,14-docosadienyl-1-phosphocholine
756. (Z,Z)-10,15-docosadienyl-1-phosphocholine
757. (Z,Z)-11,16-docosadienyl-1-phosphocholine
758. (Z,Z)-12,17-docosadienyl-1-phosphocholine
759. (Z,Z)-13,18-docosadienyl-1-phosphocholine
760. (Z,Z)-14,19-docosadienyl-1-phosphocholine

761. (Z,Z)-3,9-docosadienyl-1-phosphocholine
762. (Z,Z)-4,10-docosadienyl-1-phosphocholine
763. (Z,Z)-5,11-docosadienyl-1-phosphocholine
764. (Z,Z)-6,12-docosadienyl-1-phosphocholine
765. (Z,Z)-7,13-docosadienyl-1-phosphocholine
766. (Z,Z)-8,14-docosadienyl-1-phosphocholine
767. (Z,Z)-9,15-docosadienyl-1-phosphocholine
768. (Z,Z)-10,16-docosadienyl-1-phosphocholine
769. (Z,Z)-11,17-docosadienyl-1-phosphocholine
770. (Z,Z)-12,18-docosadienyl-1-phosphocholine
771. (Z,Z)-13,19-docosadienyl-1-phosphocholine

772. (Z,Z)-3,10-docosadienyl-1-phosphocholine
773. (Z,Z)-4,11-docosadienyl-1-phosphocholine
774. (Z,Z)-5,12-docosadienyl-1-phosphocholine
775. (Z,Z)-6,13-docosadienyl-1-phosphocholine
776. (Z,Z)-7,14-docosadienyl-1-phosphocholine
777. (Z,Z)-8,15-docosadienyl-1-phosphocholine
778. (Z,Z)-9,16-docosadienyl-1-phosphocholine
779. (Z,Z)-10,17-docosadienyl-1-phosphocholine
780. (Z,Z)-11,18-docosadienyl-1-phosphocholine
781. (Z,Z)-12,19-docosadienyl-1-phosphocholine

782. (Z,Z)-3,11-docosadienyl-1-phosphocholine
783. (Z,Z)-4,12-docosadienyl-1-phosphocholine
784. (Z,Z)-5,13-docosadienyl-1-phosphocholine
785. (Z,Z)-6,14-docosadienyl-1-phosphocholine
786. (Z,Z)-7,15-docosadienyl-1-phosphocholine
787. (Z,Z)-8,16-docosadienyl-1-phosphocholine
788. (Z,Z)-9,17-docosadienyl-1-phosphocholine
789. (Z,Z)-10,18-docosadienyl-1-phosphocholine

790. (Z,Z)-11,19-docosadienyl-1-phosphocholine

791. (Z,Z)-3,12-docosadienyl-1-phosphocholine
792. (Z,Z)-4,13-docosadienyl-1-phosphocholine
793. (Z,Z)-5,14-docosadienyl-1-phosphocholine
794. (Z,Z)-6,15-docosadienyl-1-phosphocholine
795. (Z,Z)-7,16-docosadienyl-1-phosphocholine
796. (Z,Z)-8,17-docosadienyl-1-phosphocholine
797. (Z,Z)-9,18-docosadienyl-1-phosphocholine
798. (Z,Z)-10,19-docosadienyl-1-phosphocholine

799. (Z,Z)-3,13-docosadienyl-1-phosphocholine
800. (Z,Z)-4,14-docosadienyl-1-phosphocholine
801. (Z,Z)-5,15-docosadienyl-1-phosphocholine
802. (Z,Z)-6,16-docosadienyl-1-phosphocholine
803. (Z,Z)-7,17-docosadienyl-1-phosphocholine
804. (Z,Z)-8,18-docosadienyl-1-phosphocholine
805. (Z,Z)-9,19-docosadienyl-1-phosphocholine

806. (Z,Z)-3,14-docosadienyl-1-phosphocholine
807. (Z,Z)-4,15-docosadienyl-1-phosphocholine
808. (Z,Z)-5,16-docosadienyl-1-phosphocholine
809. (Z,Z)-6,17-docosadienyl-1-phosphocholine
810. (Z,Z)-7,18-docosadienyl-1-phosphocholine
811. (Z,Z)-8,19-docosadienyl-1-phosphocholine

812. (Z,Z)-3,15-docosadienyl-1-phosphocholine
813. (Z,Z)-4,16-docosadienyl-1-phosphocholine
814. (Z,Z)-5,17-docosadienyl-1-phosphocholine
815. (Z,Z)-6,18-docosadienyl-1-phosphocholine
816. (Z,Z)-7,19-docosadienyl-1-phosphocholine

817. (Z,Z)-3,17-docosadienyl-1-phosphocholine
818. (Z,Z)-4,18-docosadienyl-1-phosphocholine
819. (Z,Z)-5,19-docosadienyl-1-phosphocholine

820. (Z,Z)-3,19-docosadienyl-1-phosphocholine

23 chain carbon atoms

$C_{28}H_{56}NO_4P$ (501.73)

821. (Z,Z)-3,7-tricosadienyl-1-phosphocholine
822. (Z,Z)-4,8-tricosadienyl-1-phosphocholine
823. (Z,Z)-5,9-tricosadienyl-1-phosphocholine
824. (Z,Z)-6,10-tricosadienyl-1-phosphocholine
825. (Z,Z)-7,11-tricosadienyl-1-phosphocholine
826. (Z,Z)-8,12-tricosadienyl-1-phosphocholine
827. (Z,Z)-9,13-tricosadienyl-1-phosphocholine
828. (Z,Z)-10,14-tricosadienyl-1-phosphocholine
829. (Z,Z)-11,15-tricosadienyl-1-phosphocholine
830. (Z,Z)-12,16-tricosadienyl-1-phosphocholine
831. (Z,Z)-13,17-tricosadienyl-1-phosphocholine
832. (Z,Z)-14,18-tricosadienyl-1-phosphocholine
833. (Z,Z)-15,19-tricosadienyl-1-phosphocholine
834. (Z,Z)-16,20-tricosadienyl-1-phosphocholine

835. (Z,Z)-3,8-tricosadienyl-1-phosphocholine
836. (Z,Z)-4,9-tricosadienyl-1-phosphocholine
837. (Z,Z)-5,10-tricosadienyl-1-phosphocholine
838. (Z,Z)-6,11-tricosadienyl-1-phosphocholine
839. (Z,Z)-7,12-tricosadienyl-1-phosphocholine
840. (Z,Z)-8,13-tricosadienyl-1-phosphocholine
841. (Z,Z)-9,14-tricosadienyl-1-phosphocholine
842. (Z,Z)-10,15-tricosadienyl-1-phosphocholine
843. (Z,Z)-11,16-tricosadienyl-1-phosphocholine
844. (Z,Z)-12,17-tricosadienyl-1-phosphocholine
845. (Z,Z)-13,18-tricosadienyl-1-phosphocholine
846. (Z,Z)-14,19-tricosadienyl-1-phosphocholine
847. (Z,Z)-15,20-tricosadienyl-1-phosphocholine

848. (Z,Z)-3,9-tricosadienyl-1-phosphocholine
849. (Z,Z)-4,10-tricosadienyl-1-phosphocholine
850. (Z,Z)-5,11-tricosadienyl-1-phosphocholine
851. (Z,Z)-6,12-tricosadienyl-1-phosphocholine
852. (Z,Z)-7,13-tricosadienyl-1-phosphocholine

853. (Z,Z)-8,14-tricosadienyl-1-phosphocholine
854. (Z,Z)-9,15-tricosadienyl-1-phosphocholine
855. (Z,Z)-10,16-tricosadienyl-1-phosphocholine
856. (Z,Z)-11,17-tricosadienyl-1-phosphocholine
857. (Z,Z)-12,18-tricosadienyl-1-phosphocholine
858. (Z,Z)-13,19-tricosadienyl-1-phosphocholine
859. (Z,Z)-14,20-tricosadienyl-1-phosphocholine

860. (Z,Z)-3,10-tricosadienyl-1-phosphocholine
861. (Z,Z)-4,11-tricosadienyl-1-phosphocholine
862. (Z,Z)-5,12-tricosadienyl-1-phosphocholine
863. (Z,Z)-6,13-tricosadienyl-1-phosphocholine
864. (Z,Z)-7,14-tricosadienyl-1-phosphocholine
865. (Z,Z)-8,15-tricosadienyl-1-phosphocholine
866. (Z,Z)-9,16-tricosadienyl-1-phosphocholine
867. (Z,Z)-10,17-tricosadienyl-1-phosphocholine
868. (Z,Z)-11,18-tricosadienyl-1-phosphocholine
869. (Z,Z)-12,19-tricosadienyl-1-phosphocholine
870. (Z,Z)-13,20-tricosadienyl-1-phosphocholine

871. (Z,Z)-3,11-tricosadienyl-1-phosphocholine
872. (Z,Z)-4,12-tricosadienyl-1-phosphocholine
873. (Z,Z)-5,13-tricosadienyl-1-phosphocholine
874. (Z,Z)-6,14-tricosadienyl-1-phosphocholine
875. (Z,Z)-7,15-tricosadienyl-1-phosphocholine
876. (Z,Z)-8,16-tricosadienyl-1-phosphocholine
877. (Z,Z)-9,17-tricosadienyl-1-phosphocholine
878. (Z,Z)-10,18-tricosadienyl-1-phosphocholine
879. (Z,Z)-11,19-tricosadienyl-1-phosphocholine
880. (Z,Z)-12,20-tricosadienyl-1-phosphocholine

881. (Z,Z)-3,12-tricosadienyl-1-phosphocholine
882. (Z,Z)-4,13-tricosadienyl-1-phosphocholine
883. (Z,Z)-5,14-tricosadienyl-1-phosphocholine
884. (Z,Z)-6,15-tricosadienyl-1-phosphocholine
885. (Z,Z)-7,16-tricosadienyl-1-phosphocholine
886. (Z,Z)-8,17-tricosadienyl-1-phosphocholine
887. (Z,Z)-9,18-tricosadienyl-1-phosphocholine

888. (Z,Z)-10,19-tricosadienyl-1-phosphocholine
889. (Z,Z)-11,20-tricosadienyl-1-phosphocholine

890. (Z,Z)-3,13-tricosadienyl-1-phosphocholine
891. (Z,Z)-4,14-tricosadienyl-1-phosphocholine
892. (Z,Z)-5,15-tricosadienyl-1-phosphocholine
893. (Z,Z)-6,16-tricosadienyl-1-phosphocholine
894. (Z,Z)-7,17-tricosadienyl-1-phosphocholine
895. (Z,Z)-8,18-tricosadienyl-1-phosphocholine
896. (Z,Z)-9,19-tricosadienyl-1-phosphocholine
897. (Z,Z)-10,20-tricosadienyl-1-phosphocholine

898. (Z,Z)-3,14-tricosadienyl-1-phosphocholine
899. (Z,Z)-4,15-tricosadienyl-1-phosphocholine
900. (Z,Z)-5,16-tricosadienyl-1-phosphocholine
901. (Z,Z)-6,17-tricosadienyl-1-phosphocholine
902. (Z,Z)-7,18-tricosadienyl-1-phosphocholine
903. (Z,Z)-8,19-tricosadienyl-1-phosphocholine
904. (Z,Z)-9,20-tricosadienyl-1-phosphocholine

905. (Z,Z)-3,15-tricosadienyl-1-phosphocholine
906. (Z,Z)-4,16-tricosadienyl-1-phosphocholine
907. (Z,Z)-5,17-tricosadienyl-1-phosphocholine
908. (Z,Z)-6,18-tricosadienyl-1-phosphocholine
909. (Z,Z)-7,19-tricosadienyl-1-phosphocholine
910. (Z,Z)-8,20-tricosadienyl-1-phosphocholine

911. (Z,Z)-3,17-tricosadienyl-1-phosphocholine
912. (Z,Z)-4,18-tricosadienyl-1-phosphocholine
913. (Z,Z)-5,19-tricosadienyl-1-phosphocholine
914. (Z,Z)-6,20-tricosadienyl-1-phosphocholine

915. (Z,Z)-3,19-tricosadienyl-1-phosphocholine
916. (Z,Z)-4,20-tricosadienyl-1-phosphocholine

24 chain carbon atoms

$C_{29}H_{58}NO_4P$ (515.76)

917. (Z,Z)-3,7-tetracosadienyl-1-phosphocholine
918. (Z,Z)-4,8-tetracosadienyl-1-phosphocholine
919. (Z,Z)-5,9-tetracosadienyl-1-phosphocholine
920. (Z,Z)-6,10-tetracosadienyl-1-phosphocholine
921. (Z,Z)-7,11-tetracosadienyl-1-phosphocholine
922. (Z,Z)-8,12-tetracosadienyl-1-phosphocholine
923. (Z,Z)-9,13-tetracosadienyl-1-phosphocholine
924. (Z,Z)-10,14-tetracosadienyl-1-phosphocholine
925. (Z,Z)-11,15-tetracosadienyl-1-phosphocholine
926. (Z,Z)-12,16-tetracosadienyl-1-phosphocholine
927. (Z,Z)-13,17-tetracosadienyl-1-phosphocholine
928. (Z,Z)-14,18-tetracosadienyl-1-phosphocholine
929. (Z,Z)-15,19-tetracosadienyl-1-phosphocholine
930. (Z,Z)-16,20-tetracosadienyl-1-phosphocholine
931. (Z,Z)-17,21-tetracosadienyl-1-phosphocholine

932. (Z,Z)-3,8-tetracosadienyl-1-phosphocholine
933. (Z,Z)-4,9-tetracosadienyl-1-phosphocholine
934. (Z,Z)-5,10-tetracosadienyl-1-phosphocholine
935. (Z,Z)-6,11-tetracosadienyl-1-phosphocholine
936. (Z,Z)-7,12-tetracosadienyl-1-phosphocholine
937. (Z,Z)-8,13-tetracosadienyl-1-phosphocholine
938. (Z,Z)-9,14-tetracosadienyl-1-phosphocholine
939. (Z,Z)-10,15-tetracosadienyl-1-phosphocholine
940. (Z,Z)-11,16-tetracosadienyl-1-phosphocholine
941. (Z,Z)-12,17-tetracosadienyl-1-phosphocholine
942. (Z,Z)-13,18-tetracosadienyl-1-phosphocholine
943. (Z,Z)-14,19-tetracosadienyl-1-phosphocholine
944. (Z,Z)-15,20-tetracosadienyl-1-phosphocholine
945. (Z,Z)-16,21-tetracosadienyl-1-phosphocholine

946. (Z,Z)-3,9-tetracosadienyl-1-phosphocholine
947. (Z,Z)-4,10-tetracosadienyl-1-phosphocholine
948. (Z,Z)-5,11-tetracosadienyl-1-phosphocholine

949. (Z,Z)-6,12-tetracosadienyl-1-phosphocholine
950. (Z,Z)-7,13-tetracosadienyl-1-phosphocholine
951. (Z,Z)-8,14-tetracosadienyl-1-phosphocholine
952. (Z,Z)-9,15-tetracosadienyl-1-phosphocholine
953. (Z,Z)-10,16-tetracosadienyl-1-phosphocholine
954. (Z,Z)-11,17-tetracosadienyl-1-phosphocholine
955. (Z,Z)-12,18-tetracosadienyl-1-phosphocholine
956. (Z,Z)-13,19-tetracosadienyl-1-phosphocholine
957. (Z,Z)-14,20-tetracosadienyl-1-phosphocholine
958. (Z,Z)-15,21-tetracosadienyl-1-phosphocholine

959. (Z,Z)-3,10-tetracosadienyl-1-phosphocholine
960. (Z,Z)-4,11-tetracosadienyl-1-phosphocholine
961. (Z,Z)-5,12-tetracosadienyl-1-phosphocholine
962. (Z,Z)-6,13-tetracosadienyl-1-phosphocholine
963. (Z,Z)-7,14-tetracosadienyl-1-phosphocholine
964. (Z,Z)-8,15-tetracosadienyl-1-phosphocholine
965. (Z,Z)-9,16-tetracosadienyl-1-phosphocholine
966. (Z,Z)-10,17-tetracosadienyl-1-phosphocholine
967. (Z,Z)-11,18-tetracosadienyl-1-phosphocholine
968. (Z,Z)-12,19-tetracosadienyl-1-phosphocholine
969. (Z,Z)-13,20-tetracosadienyl-1-phosphocholine
970. (Z,Z)-14,21-tetracosadienyl-1-phosphocholine

971. (Z,Z)-3,11-tetracosadienyl-1-phosphocholine
972. (Z,Z)-4,12-tetracosadienyl-1-phosphocholine
973. (Z,Z)-5,13-tetracosadienyl-1-phosphocholine
974. (Z,Z)-6,14-tetracosadienyl-1-phosphocholine
975. (Z,Z)-7,15-tetracosadienyl-1-phosphocholine
976. (Z,Z)-8,16-tetracosadienyl-1-phosphocholine
977. (Z,Z)-9,17-tetracosadienyl-1-phosphocholine
978. (Z,Z)-10,18-tetracosadienyl-1-phosphocholine
979. (Z,Z)-11,19-tetracosadienyl-1-phosphocholine
980. (Z,Z)-12,20-tetracosadienyl-1-phosphocholine
981. (Z,Z)-13,21-tetracosadienyl-1-phosphocholine

982. (Z,Z)-3,12-tetracosadienyl-1-phosphocholine
983. (Z,Z)-4,13-tetracosadienyl-1-phosphocholine

984. (Z,Z)-5,14-tetracosadienyl-1-phosphocholine
985. (Z,Z)-6,15-tetracosadienyl-1-phosphocholine
986. (Z,Z)-7,16-tetracosadienyl-1-phosphocholine
987. (Z,Z)-8,17-tetracosadienyl-1-phosphocholine
988. (Z,Z)-9,18-tetracosadienyl-1-phosphocholine
989. (Z,Z)-10,19-tetracosadienyl-1-phosphocholine
990. (Z,Z)-11,20-tetracosadienyl-1-phosphocholine
991. (Z,Z)-12,21-tetracosadienyl-1-phosphocholine

992. (Z,Z)-3,13-tetracosadienyl-1-phosphocholine
993. (Z,Z)-4,14-tetracosadienyl-1-phosphocholine
994. (Z,Z)-5,15-tetracosadienyl-1-phosphocholine
995. (Z,Z)-6,16-tetracosadienyl-1-phosphocholine
996. (Z,Z)-7,17-tetracosadienyl-1-phosphocholine
997. (Z,Z)-8,18-tetracosadienyl-1-phosphocholine
998. (Z,Z)-9,19-tetracosadienyl-1-phosphocholine
999. (Z,Z)-10,20-tetracosadienyl-1-phosphocholine
1000. (Z,Z)-11,21-tetracosadienyl-1-phosphocholine

1001. (Z,Z)-3,14-tetracosadienyl-1-phosphocholine
1002. (Z,Z)-4,15-tetracosadienyl-1-phosphocholine
1003. (Z,Z)-5,16-tetracosadienyl-1-phosphocholine
1004. (Z,Z)-6,17-tetracosadienyl-1-phosphocholine
1005. (Z,Z)-7,18-tetracosadienyl-1-phosphocholine
1006. (Z,Z)-8,19-tetracosadienyl-1-phosphocholine
1007. (Z,Z)-9,20-tetracosadienyl-1-phosphocholine
1008. (Z,Z)-10,21-tetracosadienyl-1-phosphocholine

1009. (Z,Z)-3,15-tetracosadienyl-1-phosphocholine
1010. (Z,Z)-4,16-tetracosadienyl-1-phosphocholine
1011. (Z,Z)-5,17-tetracosadienyl-1-phosphocholine
1012. (Z,Z)-6,18-tetracosadienyl-1-phosphocholine
1013. (Z,Z)-7,19-tetracosadienyl-1-phosphocholine
1014. (Z,Z)-8,20-tetracosadienyl-1-phosphocholine
1015. (Z,Z)-9,21-tetracosadienyl-1-phosphocholine

1016. (Z,Z)-3,17-tetracosadienyl-1-phosphocholine
1017. (Z,Z)-4,18-tetracosadienyl-1-phosphocholine

1018. (Z,Z)-5,19-tetracosadienyl-1-phosphocholine
1019. (Z,Z)-6,20-tetracosadienyl-1-phosphocholine
1020. (Z,Z)-7,21-tetracosadienyl-1-phosphocholine

1021. (Z,Z)-3,19-tetracosadienyl-1-phosphocholine
1022. (Z,Z)-4,20-tetracosadienyl-1-phosphocholine
1023. (Z,Z)-5,21-tetracosadienyl-1-phosphocholine

25 chain carbon atoms

$C_{30}H_{60}NO_4P$ (529.78)

1024. (Z,Z)-6,12-pentacosadienyl-1-phosphocholine
1025. (Z,Z)-9,15-pentacosadienyl-1-phosphocholine
1026. (Z,Z)-6,16-pentacosadienyl-1-phosphocholine
1027. (Z,Z)-9,18-pentacosadienyl-1-phosphocholine
1028. (Z,Z)-10,20-pentacosadienyl-1-phosphocholine
1029. (Z,Z)-13,20-pentacosadienyl-1-phosphocholine

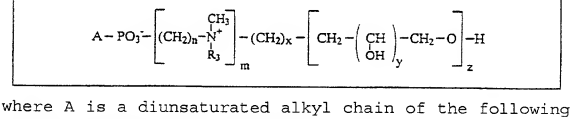
26 chain carbon atoms

$C_{31}H_{62}NO_4P$ (543.81)

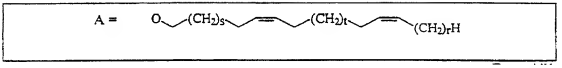
1030. (Z,Z)-6,12-hexacosadienyl-1-phosphocholine
1031. (Z,Z)-9,15-hexacosadienyl-1-phosphocholine
1032. (Z,Z)-6,16-hexacosadienyl-1-phosphocholine
1033. (Z,Z)-9,18-hexacosadienyl-1-phosphocholine
1034. (Z,Z)-6,20-hexacosadienyl-1-phosphocholine

5. Examples of (Z,Z)-alkadienyl-1-phospho-N,N,N-trimethylpropylammonium compounds

(A = IX; n = 3; R_3, CH_3; m = 1, x = 1; z = 0)



where A is a diunsaturated alkyl chain of the following structure (s,t,r ≥ 0; 8 ≤ s+t+r ≤ 26):



formula IX

1035.) (Z,Z)-5,11-hexadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{22}H_{44}NO_4P$ (417.57)

1036.) (Z,Z)-5,11-heptadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{23}H_{46}NO_4P$ (431.60)

1037.) (Z,Z)-5,11-octadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{24}H_{48}NO_4P$ (445.62)

1038.) (Z,Z)-6,12-nonadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{25}H_{50}NO_4P$ (459.65)

1039.) (Z,Z)-10,16-eicosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{26}H_{52}NO_4P$ (473.68)

1040.) (Z,Z)-10,16-heneicosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{27}H_{54}NO_4P$ (487.70)

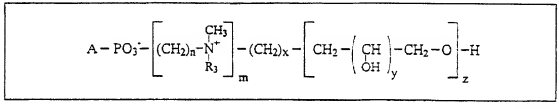
1041.) (Z,Z)-10,16-docosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{28}H_{56}NO_4P$ (501.73)

1042.) (Z,Z)-10,16-tricosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{29}H_{58}NO_4P$ (515.76)

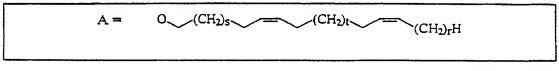
1043.) (Z,Z)-6,18-tetracosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{30}H_{60}NO_4P$ (529.78)

6. Examples of (Z,Z)-alkadienyl-1-phospho-N,N,N-trimethylbutylammonium compounds

(A = IX; n = 4; R_3; CH_3; m = 1, x = 1; z = 0)



where A is a diunsaturated alkyl chain of the following structure (s,t,r ≥ 0; 8 ≤ s+t+r ≤ 26):



formula IX

1044.) (Z,Z)-5,11-hexadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{23}H_{46}NO_4P$ (431.60)

1045.) (Z,Z)-5,11-heptadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{24}H_{48}NO_4P$ (445.62)

1046.) (Z,Z)-5,11-octadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{25}H_{50}NO_4P$ (459.65)

1047.) (Z,Z)-6,12-nonadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{26}H_{52}NO_4P$ (473.68)

1048.) (Z,Z)-10,16-eicosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{27}H_{54}NO_4P$ (487.70)

1049.) (Z,Z)-10,16-heneicosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{28}H_{56}NO_4P$ (501.73)

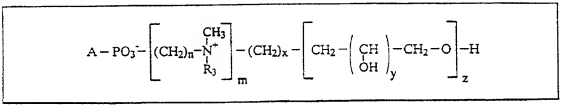
1050.) (Z,Z)-10,16-docosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{29}H_{58}NO_4P$ (515.76)

1051.) (Z,Z)-10,16-tricosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{30}H_{60}NO_4P$ (529.78)

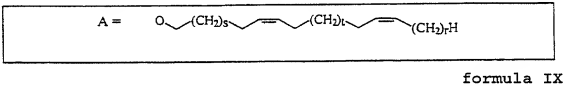
1052.) (Z,Z)-6,18-tetracosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{31}H_{62}NO_4P$ (543.81)

7. *Examples of terminally unsaturated alkadienylphosphocholines*

(A = IX; n = 2; R_3, CH_3; m = 1, x = 1; z = 0)



where A is a diunsaturated alkyl chain of the following structure (s,t ≥ 0; r = 0; 8 ≤ s+t+r ≤ 26):



formula IX

1053.) (Z)-11,15-hexadecadienyl-1-phosphocholine
$C_{21}H_{42}NO_4P$ (403.54)

1054.) (Z)-11,16-heptadecadienyl-1-phosphocholine
$C_{22}H_{44}NO_4P$ (417.57)

1055.) (Z)-11,17-octadecadienyl-1-phosphocholine
$C_{23}H_{46}NO_4P$ (431.60)

1056.) (Z)-11,18-nonadecadienyl-1-phosphocholine
$C_{24}H_{48}NO_4P$ (445.62)

1057.) (Z)-11,19-eicosadienyl-1-phosphocholine
$C_{25}H_{50}NO_4P$ (459.65)

1058.) (Z)-11,20-heneicosadienyl-1-phosphocholine
$C_{26}H_{52}NO_4P$ (473.68)

1059.) (Z)-11,21-docosadienyl-1-phosphocholine
$C_{27}H_{54}NO_4P$ (487.70)

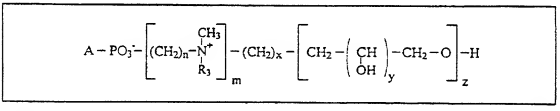
1060.) (Z)-11,22-tricosadienyl-1-phosphocholine
$C_{28}H_{56}NO_4P$ (501.73)

1061.) (Z)-11,23-tetracosadienyl-1-phosphocholine
$C_{29}H_{58}NO_4P$ (515.76)

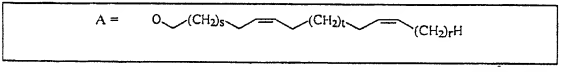
1062.) (Z)-11,24-pentacosadienyl-1-phosphocholine
$C_{30}H_{60}NO_4P$ (529.78)

8. Examples of terminally unsaturated alkadienyl-1-phospho-N,N,N-trimethylpropylammonium compounds

(A = IX; n = 3; R_3, CH_3; m = 1, x = 1; z = 0)



where A is a diunsaturated alkyl chain of the following structure (s,t ≥ 0; r = 0; 8 ≤ s+t+r ≤ 26):



formula IX

1063.) (Z)-11,15-hexadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{22}H_{44}NO_4P$ (417.57)

1064.) (Z)-11,16-heptadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{23}H_{46}NO_4P$ (431.60)

1065.) (Z)-11,17-octadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{24}H_{48}NO_4P$ (445.62)

1066.) (Z)-11,18-nonadecadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{25}H_{50}NO_4P$ (459.65)

1067.) (Z)-11,19-eicosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{26}H_{52}NO_4P$ (473.68)

1068.) (Z)-11,20-heneicosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{27}H_{54}NO_4P$ (487.70)

1069.) (Z)-11,21-docosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{28}H_{56}NO_4P$ (501.73)

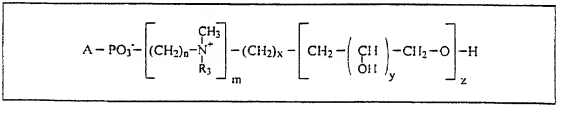
1070.) (Z)-11,22-tricosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{29}H_{58}NO_4P$ (515.76)

1071.) (Z)-11,23-tetracosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{30}H_{60}NO_4P$ (529.78)

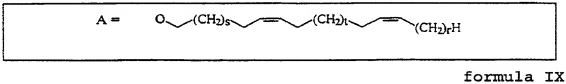
1072.) (Z)-11,24-pentacosadienyl-1-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{62}NO_4P$ (543.81)

9. Examples of terminally unsaturated alkadienyl-1-phospho-N,N,N-trimethylbutylammonium compounds

(A = IX; n = 4; R_3, CH_3; m = 1, x = 1; z = 0)



where A is a diunsaturated alkyl chain of the following structure (s,t ≥ 0; r = 0; 8 ≤ s+t+r ≤ 26):



formula IX

1073.) (Z)-11,15-hexadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{23}H_{46}NO_4P$ (431.60)

1074.) (Z)-11,16-heptadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{24}H_{48}NO_4P$ (445.62)

1075.) (Z)-11,17-octadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{25}H_{50}NO_4P$ (459.65)

1076.) (Z)-11,18-nonadecadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{26}H_{52}NO_4P$ (473.68)

1077.) (Z)-11,19-eicosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{27}H_{54}NO_4P$ (487.70)

1078.) (Z)-11,20-heneicosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{28}H_{56}NO_4P$ (501.73)

1079.) (Z)-11,21-docosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{29}H_{58}NO_4P$ (515.76)

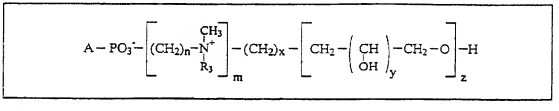
1080.) (Z)-11,22-tricosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{30}H_{60}NO_4P$ (529.78)

1081.) (Z)-11,23-tetracosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{31}H_{62}NO_4P$ (543.81)

1082.) (Z)-11,24-pentacosadienyl-1-phospho-N,N,N-trimethylbutylammonium
$C_{32}H_{64}NO_4P$ (557.84)

10. Active ingredients based on alkylated (ether)lysolecithins - monounsaturated compounds

(A = III or A = IV; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1083.) 1-O-(Z)-6-octadecenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{27}H_{56}NO_6P$ (521.72)

1084.) 1-O-(Z)-10-octadecenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{27}H_{56}NO_6P$ (521.72)

1085.) 1-O-(Z)-12-octadecenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{27}H_{56}NO_6P$ (521.72)

1086.) 1-O-(Z)-6-nonadecenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{28}H_{58}NO_6P$ (535.75)

1087.) 1-O-(Z)-10-nonadecenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{28}H_{58}NO_6P$ (535.75)

1088.) 1-O-(Z)-12-nonadecenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)

$C_{28}H_{58}NO_6P$ (535.75)

1089.) 1-O-(Z)-6-eicosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{29}H_{60}NO_6P$ (549.77)

1090.) 1-O-(Z)-10-eicosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{29}H_{60}NO_6P$ (549.77)

1091.) 1-O-(Z)-12-eicosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{29}H_{60}NO_6P$ (549.77)

1092.) 1-O-(Z)-6-heneicosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{30}H_{62}NO_6P$ (563.80)

1093.) 1-O-(Z)-10-heneicosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{30}H_{62}NO_6P$ (563.80)

1094.) 1-O-(Z)-12-heneicosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{30}H_{62}NO_6P$ (563.80)

1095.) 1-O-(Z)-6-docosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{31}H_{64}NO_6P$ (577.83)

1096.) 1-O-(Z)-10-docosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{31}H_{64}NO_6P$ (577.83)

1097.) 1-O-(Z)-12-docosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{31}H_{64}NO_6P$ (577.83)

1098.) 1-O-(Z)-6-tricosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{32}H_{66}NO_6P$ (591.86)

1099.) 1-O-(Z)-10-tricosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{32}H_{66}NO_6P$ (591.86)

1100.) 1-O-(Z)-12-tricosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{32}H_{66}NO_6P$ (591.86)

1101.) 1-O-(Z)-6-tetracosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{33}H_{68}NO_6P$ (605.89)

1102.) 1-O-(Z)-10-tetracosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{33}H_{68}NO_6P$ (605.89)

1103.) 1-O-(Z)-12-tetracosenyl-2-O-methyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{33}H_{68}NO_6P$ (605.89)

1104.) 1-O-(Z)-6-octadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{28}H_{58}NO_6P$ (535.75)

1105.) 1-O-(Z)-10-octadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{28}H_{58}NO_6P$ (535.75)

1106.) 1-O-(Z)-12-octadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{28}H_{58}NO_6P$ (535.75)

1107.) 1-O-(Z)-6-nonadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{60}NO_6P$ (549.77)

1108.) 1-O-(Z)-10-nonadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{60}NO_6P$ (549.77)

1109.) 1-O-(Z)-12-nonadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{60}NO_6P$ (549.77)

1110.) 1-O-(Z)-6-eicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{30}H_{62}NO_6P$ (563.80)

1111.) 1-O-(Z)-10-eicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{30}H_{62}NO_6P$ (563.80)

1112.) 1-O-(Z)-12-eicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{30}H_{62}NO_6P$ (563.80)

1113.) 1-O-(Z)-6-heneicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{64}NO_6P$ (577.83)

1114.) 1-O-(Z)-10-heneicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{64}NO_6P$ (577.83)

1115.) 1-O-(Z)-12-heneicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{64}NO_6P$ (577.83)

1116.) 1-O-(Z)-6-docosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{66}NO_6P$ (591.86)

1117.) 1-O-(Z)-10-docosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{66}NO_6P$ (591.86)

1118.) 1-O-(Z)-12-docosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{66}NO_6P$ (591.86)

1119.) 1-O-(Z)-6-tricosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{68}NO_6P$ (605.89)

1120.) 1-O-(Z)-10-tricosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{68}NO_6P$ (605.89)

1121.) 1-O-(Z)-12-tricosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{68}NO_6P$ (605.89)

1122.) 1-O-(Z)-6-tetracosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{70}NO_6P$ (619.91)

1123.) 1-O-(Z)-10-tetracosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{70}NO_6P$ (619.91)

1124.) 1-O-(Z)-12-tetracosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{70}NO_6P$ (619.91)

1125.) 1-O-(Z)-6-octadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{29}H_{60}NO_6P$ (549.77)

1126.) 1-O-(Z)-10-octadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{29}H_{60}NO_6P$ (549.77)

1127.) 1-O-(Z)-12-octadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{29}H_{60}NO_6P$ (549.77)

1128.) 1-O-(Z)-6-nonadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{30}H_{62}NO_6P$ (563.80)

1129.) 1-O-(Z)-10-nonadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{30}H_{62}NO_6P$ (563.80)

1130.) 1-O-(Z)-12-nonadecenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{30}H_{62}NO_6P$ (563.80)

1131.) 1-O-(Z)-6-eicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{31}H_{64}NO_6P$ (577.83)

1132.) 1-O-(Z)-10-eicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{31}H_{64}NO_6P$ (577.83)

1133.) 1-O-(Z)-12-eicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{31}H_{64}NO_6P$ (577.83)

1134.) 1-O-(Z)-6-heneicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{32}H_{66}NO_6P$ (591.86)

1135.) 1-O-(Z)-10-heneicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{32}H_{66}NO_6P$ (591.86)

1136.) 1-O-(Z)-12-heneicosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{32}H_{66}NO_6P$ (591.86)

1137.) 1-O-(Z)-6-docosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)

$C_{33}H_{68}NO_6P$ (605.89)

1138.) 1-O-(Z)-10-docosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{33}H_{68}NO_6P$ (605.89)

1139.) 1-O-(Z)-12-docosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{33}H_{68}NO_6P$ (605.89)

1140.) 1-O-(Z)-6-tricosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{34}H_{70}NO_6P$ (619.91)

1141.) 1-O-(Z)-10-tricosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{34}H_{70}NO_6P$ (619.91)

1142.) 1-O-(Z)-12-tricosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{34}H_{70}NO_6P$ (619.91)

1143.) 1-O-(Z)-6-tetracosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{35}H_{72}NO_6P$ (633.93)

1144.) 1-O-(Z)-10-tetracosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{35}H_{72}NO_6P$ (633.93)

1145.) 1-O-(Z)-12-tetracosenyl-2-O-methyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{35}H_{72}NO_6P$ (633.93)

1146.) 1-O-(Z)-10-octadecenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{27}H_{56}NO_6P$ (521.72)

1147.) 1-O-(Z)-6-nonadecenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{28}H_{58}NO_6P$ (535.75)

1148.) 1-O-(Z)-12-eicosenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{29}H_{60}NO_6P$ (549.77)

1149.) 1-O-(Z)-10-heneicosenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{30}H_{62}NO_6P$ (563.80)

1150.) 1-O-(Z)-10-docosenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{31}H_{64}NO_6P$ (577.83)

1151.) 1-O-(Z)-12-docosenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{31}H_{64}NO_6P$ (577.83)

1152.) 1-O-(Z)-10-tricosenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{32}H_{66}NO_6P$ (591.86)

1153.) 1-O-(Z)-10-tetracosenyl-3-O-methyl-*sn*-glycero-2-phosphocholine (n = 2)
$C_{33}H_{68}NO_6P$ (605.89)

1154.) 1-O-(Z)-10-octadecenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{28}H_{58}NO_6P$ (535.75)

1155.) 1-O-(Z)-6-nonadecenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{60}NO_6P$ (549.77)

1156.) 1-O-(Z)-12-eicosenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{30}H_{62}NO_6P$ (563.80)

1157.) 1-O-(Z)-10-heneicosenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{64}NO_6P$ (577.83)

1158.) 1-O-(Z)-10-docosenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{66}NO_6P$ (591.86)

1159.) 1-O-(Z)-12-docosenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{66}NO_6P$ (591.86)

1160.) 1-O-(Z)-10-tricosenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{68}NO_6P$ (605.89)

1161.) 1-O-(Z)-10-tetracosenyl-3-O-methyl-*sn*-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{70}NO_6P$ (619.91)

1162.) 1-O-(Z)-10-octadecenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{30}H_{62}NO_6P$ (563.80)

1163.) 1-O-(Z)-6-nonadecenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{31}H_{64}NO_6P$ (577.82)

1164.) 1-O-(Z)-12-eicosenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{32}H_{66}NO_6P$ (591.85)

1165.) 1-O-(Z)-10-heneicosenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{33}H_{68}NO_6P$ (605.88)

1166.) 1-O-(Z)-10-docosenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{34}H_{70}NO_6P$ (619.91)

1167.) 1-O-(Z)-12-docosenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{34}H_{70}NO_6P$ (619.91)

1168.) 1-O-(Z)-10-tricosenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{35}H_{72}NO_6P$ (633.94)

1169.) 1-O-(Z)-10-tetracosenyl-2-O-tert-butyl-*sn*-glycero-3-phosphocholine (n = 2)
$C_{36}H_{74}NO_6P$ (647.97)

1170.) 1-O-(Z)-10-octadecenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{64}NO_6P$ (577.82)

1171.) 1-O-(Z)-6-nonadecenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{66}NO_6P$ (591.85)

1172.) 1-O-(Z)-12-eicosenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{68}NO_6P$ (605.88)

1173.) 1-O-(Z)-10-heneicosenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{70}NO_6P$ (619.91)

1174.) 1-O-(Z)-10-docosenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{72}NO_6P$ (633.94)

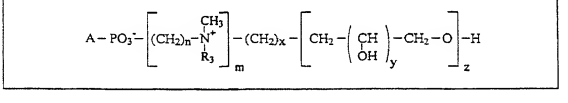
1175.) 1-O-(Z)-12-docosenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{72}NO_6P$ (633.94)

1176.) 1-O-(Z)-10-tricosenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{36}H_{74}NO_6P$ (647.97)

1177.) 1-O-(Z)-10-tetracosenyl-2-O-tert-butyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{37}H_{76}NO_6P$ (661.99)

11. Active ingredients based on alkylated (ether) lysolecithins - diunsaturated compounds

(A = III or A = IV; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1-O-(Z,Z)-Alkadienyl-2-O-methyl-sn-glycero-3-phosphocholines

1178.) 1-O-(Z,Z)-6,12-hexadecadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{25}H_{50}NO_6P$ (491.65)

1179.) 1-O-(Z,Z)-6,12-heptadecadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{26}H_{52}NO_6P$ (505.68)

1180.) 1-O-(Z,Z)-6,12-octadecadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{27}H_{54}NO_6P$ (519.71)

1181.) 1-O-(Z,Z)-6,12-nonadecadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{28}H_{56}NO_6P$ (533.74)

1182.) 1-O-(Z,Z)-9,15-eicosadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{29}H_{58}NO_6P$ (547.77)

1183.) 1-O-(Z,Z)-9,15-heneicosadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{30}H_{60}NO_6P$ (561.8)

1184.) 1-O-(Z,Z)-5,17-docosadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{31}H_{62}NO_6P$ (575.83)

1185.) 1-O-(Z,Z)-6,18-tricosadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{32}H_{64}NO_6P$ (589.86)

1186.) 1-O-(Z,Z)-6,18-tetracosadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{33}H_{66}NO_6P$ (603.89)

1187.) 1-O-(Z,Z)-6,18-pentacosadienyl-2-O-methyl-sn-glycero-3-phosphocholine (n = 2)
$C_{34}H_{68}NO_6P$ (617.92)

1-O-(Z,Z)-Alkadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium compounds

1188.) 1-O-(Z,Z)-6,12-hexadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{26}H_{52}NO_6P$ (505.68)

1189.) 1-O-(Z,Z)-6,12-heptadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{27}H_{54}NO_6P$ (519.71)

1190.) 1-O-(Z,Z)-6,12-octadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{28}H_{56}NO_6P$ (533.74)

1191.) 1-O-(Z,Z)-6,12-nonadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{58}NO_6P$ (547.77)

1192.) 1-O-(Z,Z)-9,15-eicosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{30}H_{60}NO_6P$ (561.8)

1193.) 1-O-(Z,Z)-9,15-heneicosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{62}NO_6P$ (575.83)

1194.) 1-O-(Z,Z)-5,17-docosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{64}NO_6P$ (589.86)

1195.) 1-O-(Z,Z)-6,18-tricosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{66}NO_6P$ (603.89)

1196.) 1-O-(Z,Z)-6,18-tetracosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{68}NO_6P$ (617.92)

1197.) 1-O-(Z,Z)-6,18-pentacosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{70}NO_6P$ (631.95)

1-O-(Z,Z)-Alkadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium compounds

1198.) 1-O-(Z,Z)-6,12-hexadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{27}H_{54}NO_6P$ (519.71)

1199.) 1-O-(Z,Z)-6,12-heptadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{28}H_{56}NO_6P$ (533.74)

1200.) 1-O-(Z,Z)-6,12-octadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{29}H_{58}NO_6P$ (547.77)

1201.) 1-O-(Z,Z)-6,12-nonadecadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{30}H_{60}NO_6P$ (561.8)

1202.) 1-O-(Z,Z)-9,15-eicosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{31}H_{62}NO_6P$ (575.83)

1203.) 1-O-(Z,Z)-9,15-heneicosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{32}H_{64}NO_6P$ (589.86)

1204.) 1-O-(Z,Z)-5,17-docosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{33}H_{66}NO_6P$ (603.89)

1205.) 1-O-(Z,Z)-6,18-tricosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{34}H_{68}NO_6P$ (617.92)

1206.) 1-O-(Z,Z)-6,18-tetracosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)

$C_{35}H_{70}NO_6P$ (631.95)

1207.) 1-O-(Z,Z)-6,18-pentacosadienyl-2-O-methyl-sn-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{36}H_{72}NO_6P$ (645.94)

1-O-(Z,Z)-Alkadienyl-3-O-methyl-sn-glycero-2-phospho-choline (n = 2)

1208.) 1-O-(Z,Z)-6,12-hexadecadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{25}H_{50}NO_6P$ (491.65)

1209.) 1-O-(Z,Z)-6,12-heptadecadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{26}H_{52}NO_6P$ (505.68)

1210.) 1-O-(Z,Z)-6,12-octadecadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{27}H_{54}NO_6P$ (519.71)

1211.) 1-O-(Z,Z)-6,12-nonadecadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{28}H_{56}NO_6P$ (533.74)

1212.) 1-O-(Z,Z)-9,15-eicosadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{29}H_{58}NO_6P$ (547.77)

1213.) 1-O-(Z,Z)-9,15-heneicosadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{30}H_{60}NO_6P$ (561.8)

1214.) 1-O-(Z,Z)-5,17-docosadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{31}H_{62}NO_6P$ (575.83)

1215.) 1-O-(Z,Z)-6,18-tricosadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{32}H_{64}NO_6P$ (589.86)

1216.) 1-O-(Z,Z)-6,18-tetracosadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)
$C_{29}H_{58}NO_4P$ (515.76)

1217.) 1-O-(Z,Z)-6,18-pentacosadienyl-3-O-methyl-sn-glycero-2-phosphocholine (n = 2)

$C_{34}H_{68}NO_6P$ (617.92)

1-O-(Z,Z)-Alkadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium compounds

1218.) 1-O-(Z,Z)-6,12-hexadecadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{26}H_{52}NO_6P$ (505.68)

1219.) 1-O-(Z,Z)-6,12-heptadecadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{27}H_{54}NO_6P$ (519.71)

1220.) 1-O-(Z,Z)-6,12-octadecadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{28}H_{56}NO_6P$ (533.74)

1221.) 1-O-(Z,Z)-6,12-nonadecadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{58}NO_6P$ (547.77)

1222.) 1-O-(Z,Z)-9,15-eicosadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{30}H_{60}NO_6P$ (561.8)

1223.) 1-O-(Z,Z)-9,15-heneicosadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{62}NO_6P$ (575.83)

1224.) 1-O-(Z,Z)-5,17-docosadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{64}NO_6P$ (589.86)

1225.) 1-O-(Z,Z)-6,18-tricosadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{66}NO_6P$ (603.89)

1226.) 1-O-(Z,Z)-6,18-tetracosadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{68}NO_6P$ (617.92)

1227.) 1-O-(Z,Z)-6,18-pentacosadienyl-3-O-methyl-sn-glycero-2-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{70}NO_6P$ (631.95)

1-O-(Z,Z)-Alkadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)

1228.) 1-O-(Z,Z)-6,12-hexadecadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{28}H_{56}NO_6P$ (533.73)

1229.) 1-O-(Z,Z)-6,12-heptadecadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{29}H_{58}NO_6P$ (547.76)

1230.) 1-O-(Z,Z)-6,12-octadecadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{30}H_{60}NO_6P$ (561.78)

1231.) 1-O-(Z,Z)-6,12-nonadecadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{31}H_{62}NO_6P$ (575.81)

1232.) 1-O-(Z,Z)-9,15-eicosadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{32}H_{64}NO_6P$ (589.84)

1233.) 1-O-(Z,Z)-9,15-heneicosadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{33}H_{66}NO_6P$ (603.87)

1234.) 1-O-(Z,Z)-5,17-docosadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{34}H_{68}NO_6P$ (617.9)

1235.) 1-O-(Z,Z)-6,18-tricosadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{35}H_{70}NO_6P$ (631.93)

1236.) 1-O-(Z,Z)-6,18-tetracosadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)

$C_{36}H_{72}NO_6P$ (645.96)

1237.) 1-O-(Z,Z)-6,18-pentacosadienyl-2-O-tert-butyl-sn-glycero-3-phosphocholine (n = 2)
$C_{37}H_{74}NO_6P$ (660.03)

1-O-(Z,Z)-Alkadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium compounds

1238.) 1-O-(Z,Z)-6,12-hexadecadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{29}H_{58}NO_6P$ (547.76)

1239.) 1-O-(Z,Z)-6,12-heptadecadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{30}H_{60}NO_6P$ (561.78)

1240.) 1-O-(Z,Z)-6,12-octadecadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{31}H_{62}NO_6P$ (575.81)

1241.) 1-O-(Z,Z)-6,12-nonadecadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{32}H_{64}NO_6P$ (589.84)

1242.) 1-O-(Z,Z)-9,15-eicosadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{66}NO_6P$ (603.87)

1243.) 1-O-(Z,Z)-9,15-heneicosadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{34}H_{68}NO_6P$ (617.9)

1244.) 1-O-(Z,Z)-5,17-docosadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{70}NO_6P$ (631.93)

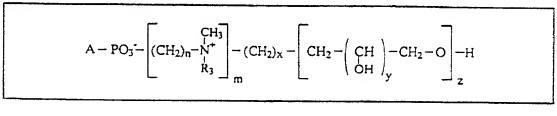
1245.) 1-O-(Z,Z)-6,18-tricosadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{36}H_{72}NO_6P$ (645.96)

1246.) 1-O-(Z,Z)-6,18-tetracosadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{37}H_{74}NO_6P$ (660.03)

1247.) 1-O-(Z,Z)-6,18-pentacosadienyl-2-O-tert-butyl-sn-glycero-3-phospho-N,N,N-trimethylpropyl-ammonium (n = 3)
$C_{38}H_{76}NO_6P$ (674.03)

12. Active ingredients based on alkanediol-phospho compounds - monounsaturated compounds

(A = VI or VII; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1-O-(Z)-Alkenylpropanediol-(1,2)-phosphocholines

1248.) 1-O-(Z)-10-octadecenylpropanediol-(1,2)-phosphocholine
$C_{26}H_{54}NO_5P$ (491.68)

1249.) 1-O-(Z)-6-nonadecenylpropanediol-(1,2)-phosphocholine
$C_{27}H_{56}NO_5P$ (505.71)

1250.) 1-O-(Z)-12-eicosenylpropanediol-(1,2)-phosphocholine
$C_{28}H_{58}NO_5P$ (519.74)

1251.) 1-O-(Z)-10-heneicosenylpropanediol-(1,2)-phosphocholine
$C_{29}H_{60}NO_5P$ (533.77)

1252.) 1-O-(Z)-10-docosenylpropanediol-(1,2)-phosphocholine
$C_{30}H_{62}NO_5P$ (547.80)

1253.) 1-O-(Z)-12-docosenylpropanediol-(1,2)-phosphocholine
$C_{30}H_{62}NO_5P$ (547.80)

1254.) 1-O-(Z)-10-tricosenylpropanediol-(1,2)-phosphocholine
$C_{31}H_{64}NO_5P$ (561.83)

1255.) 1-O-(Z)-10-tetracosenylpropanediol-(1,2)-phosphocholine
$C_{32}H_{66}NO_5P$ (575.86)

1-O-(Z)-Alkenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium compounds

1256.) 1-O-(Z)-10-octadecenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{27}H_{56}NO_5P$ (505.71)

1257.) 1-O-(Z)-6-nonadecenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{28}H_{58}NO_5P$ (519.74)

1258.) 1-O-(Z)-12-eicosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{29}H_{60}NO_5P$ (533.77)

1259.) 1-O-(Z)-10-heneicosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{30}H_{62}NO_5P$ (547.80)

1260.) 1-O-(Z)-10-docosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{64}NO_5P$ (561.83)

1261.) 1-O-(Z)-12-docosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{64}NO_5P$ (561.83)

1262.) 1-O-(Z)-10-tricosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{32}H_{66}NO_5P$ (575.86)

1263.) 1-O-(Z)-10-tetracosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{33}H_{68}NO_5P$ (589.89)

2-O-(Z)-Alkenylpropanediol-(1,2)-phosphocholines

1264.) 2-O-(Z)-10-octadecenylpropanediol-(1,2)-phosphocholine
$C_{26}H_{54}NO_5P$ (491.68)

1265.) 2-O-(Z)-6-nonadecenylpropanediol-(1,2)-phosphocholine
$C_{27}H_{56}NO_5P$ (505.71)

1266.) 2-O-(Z)-12-eicosenylpropanediol-(1,2)-phosphocholine
$C_{28}H_{58}NO_5P$ (519.74)

1267.) 2-O-(Z)-10-heneicosenylpropanediol-(1,2)-phosphocholine
$C_{29}H_{60}NO_5P$ (533.77)

1268.) 2-O-(Z)-10-docosenylpropanediol-(1,2)-phosphocholine
$C_{30}H_{62}NO_5P$ (547.80)

1269.) 2-O-(Z)-12-docosenylpropanediol-(1,2)-phosphocholine
$C_{30}H_{62}NO_5P$ (547.80)

1270.) 2-O-(Z)-10-tricosenylpropanediol-(1,2)-phosphocholine
$C_{31}H_{64}NO_5P$ (561.83)

1271.) 2-O-(Z)-10-tetracosenylpropanediol-(1,2)-phosphocholine
$C_{32}H_{66}NO_5P$ (575.86)

2-O-(Z)-Alkenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium compounds

1272.) 2-O-(Z)-10-octadecenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{27}H_{56}NO_5P$ (505.71)

1273.) 2-O-(Z)-6-nonadecenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{28}H_{58}NO_5P$ (519.74)

1274.) 2-O-(Z)-12-eicosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium

$C_{29}H_{60}NO_5P$ (533.77)

1275.) 2-O-(Z)-10-heneicosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{30}H_{62}NO_5P$ (547.80)

1276.) 2-O-(Z)-10-docosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{64}NO_5P$ (561.83)

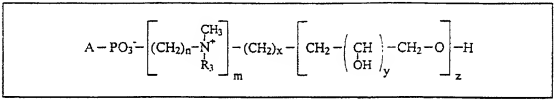
1277.) 2-O-(Z)-12-docosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{64}NO_5P$ (561.83)

1278.) 2-O-(Z)-10-tricosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{32}H_{66}NO_5P$ (575.86)

1279.) 2-O-(Z)-10-tetracosenylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{33}H_{68}NO_5P$ (589.89)

13. Active ingredients based on alkanediol-phospho compounds - diunsaturated compounds

(A = VI or VII; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1-O-(Z,Z)-Alkadienylpropanediol-(1,2)-phosphocholines

1280.) 1-O-(Z,Z)-6,12-hexadecadienylpropanediol-(1,2)-phosphocholine
$C_{24}H_{48}NO_5P$ (461.62)

1281.) 1-O-(Z,Z)-6,12-heptadecadienylpropanediol-(1,2)-phosphocholine
$C_{25}H_{50}NO_5P$ (475.65)

1282.) 1-O-(Z,Z)-6,12-octadecadienylpropanediol-(1,2)-phosphocholine
$C_{26}H_{52}NO_5P$ (489.68)

1283.) 1-O-(Z,Z)-6,12-nonadecadienylpropanediol-(1,2)-phosphocholine

$C_{27}H_{54}NO_5P$ (503.71)

1284.) 1-O-(Z,Z)-9,15-eicosadienylpropanediol-(1,2)-phosphocholine
$C_{28}H_{56}NO_5P$ (517.74)

1285.) 1-O-(Z,Z)-9,15-heneicosadienylpropanediol-(1,2)-phosphocholine
$C_{29}H_{58}NO_5P$ (531.77)

1286.) 1-O-(Z,Z)-5,17-docosadienylpropanediol-(1,2)-phosphocholine
$C_{30}H_{60}NO_5P$ (545.8)

1287.) 1-O-(Z,Z)-6,18-tricosadienylpropanediol-(1,2)-phosphocholine
$C_{31}H_{62}NO_5P$ (559.83)

1288.) 1-O-(Z,Z)-6,18-tetracosadienylpropanediol-(1,2)-phosphocholine
$C_{32}H_{64}NO_5P$ (573.86)

1289.) 1-O-(Z,Z)-6,18-pentacosadienylpropanediol-(1,2)-phosphocholine
$C_{33}H_{66}NO_5P$ (587.89)

1-O-(Z,Z)-Alkadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium compounds

1290.) 1-O-(Z,Z)-6,12-hexadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{25}H_{50}NO_5P$ (475.65)

1291.) 1-O-(Z,Z)-6,12-heptadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{26}H_{52}NO_5P$ (489.68)

1292.) 1-O-(Z,Z)-6,12-octadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{27}H_{54}NO_5P$ (503.71)

1293.) 1-O-(Z,Z)-6,12-nonadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{28}H_{56}NO_5P$ (517.74)

1294.) 1-O-(Z,Z)-9,15-eicosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{29}H_{58}NO_5P$ (531.77)

1295.) 1-O-(Z,Z)-9,15-heneicosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{30}H_{60}NO_5P$ (545.8)

1296.) 1-O-(Z,Z)-5,17-docosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{62}NO_5P$ (559.83)

1297.) 1-O-(Z,Z)-6,18-tricosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{32}H_{64}NO_5P$ (573.86)

1298.) 1-O-(Z,Z)-6,18-tetracosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{33}H_{66}NO_5P$ (587.89)

1299.) 1-O-(Z,Z)-6,18-pentacosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{34}H_{68}NO_5P$ (601.92)

2-O-(Z,Z)-Alkadienylpropanediol-(1,2)-phosphocholines

1300.) 2-O-(Z,Z)-6,12-hexadecadienylpropanediol-(1,2)-phosphocholine
$C_{24}H_{48}NO_5P$ (461.62)

1301.) 2-O-(Z,Z)-6,12-heptadecadienylpropanediol-(1,2)-phosphocholine
$C_{25}H_{50}NO_5P$ (475.65)

1302.) 2-O-(Z,Z)-6,12-octadecadienylpropanediol-(1,2)-phosphocholine
$C_{26}H_{52}NO_5P$ (489.68)

1303.) 2-O-(Z,Z)-6,12-nonadecadienylpropanediol-(1,2)-phosphocholine
$C_{27}H_{54}NO_5P$ (503.71)

1304.) 2-O-(Z,Z)-9,15-eicosadienylpropanediol-(1,2)-phosphocholine
$C_{28}H_{56}NO_5P$ (517.74)

1305.) 2-O-(Z,Z)-9,15-heneicosadienylpropanediol-(1,2)-phosphocholine
$C_{29}H_{58}NO_5P$ (531.77)

1306.) 2-O-(Z,Z)-5,17-docosadienylpropanediol-(1,2)-phosphocholine

$C_{30}H_{60}NO_5P$ (545.8)

1307.) 2-O-(Z,Z)-6,18-tricosadienylpropanediol-(1,2)-phosphocholine
$C_{31}H_{62}NO_5P$ (559.83)

1308.) 2-O-(Z,Z)-6,18-tetracosadienylpropanediol-(1,2)-phosphocholine
$C_{32}H_{64}NO_5P$ (573.86)

1309.) 2-O-(Z,Z)-6,18-pentacosadienylpropanediol-(1,2)-phosphocholine
$C_{33}H_{66}NO_5P$ (587.89)

2-O-(Z,Z)-Alkadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium compounds

1310.) 2-O-(Z,Z)-6,12-hexadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{25}H_{50}NO_5P$ (475.65)

1311.) 2-O-(Z,Z)-6,12-heptadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{26}H_{52}NO_5P$ (489.68)

1312.) 2-O-(Z,Z)-6,12-octadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{27}H_{54}NO_5P$ (503.71)

1313.) 2-O-(Z,Z)-6,12-nonadecadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{28}H_{56}NO_5P$ (517.74)

1314.) 2-O-(Z,Z)-9,15-eicosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{29}H_{58}NO_5P$ (531.77)

1315.) 2-O-(Z,Z)-9,15-heneicosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{30}H_{60}NO_5P$ (545.8)

1316.) 2-O-(Z,Z)-5,17-docosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{31}H_{62}NO_5P$ (559.83)

1317.) 2-O-(Z,Z)-6,18-tricosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{32}H_{64}NO_5P$ (573.86)

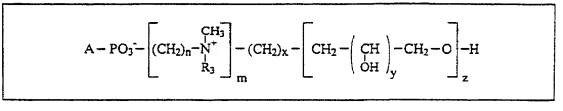
1318.) 2-O-(Z,Z)-6,18-tetracosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{33}H_{66}NO_5P$ (587.89)

1319.) 2-O-(Z,Z)-6,18-pentacosadienylpropanediol-(1,2)-phospho-N,N,N-trimethylpropylammonium
$C_{34}H_{68}NO_5P$ (601.92)

Solubilizers

1. Examples of single-chain glycero-phospho-N,N-dimethyl-N-dihydroxypropylalkylammonium compounds

(A = III or IV; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 1)



n = 2

1320.) 1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{26}H_{52}NO_9P$ (553.67)

1321.) 1-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{27}H_{54}NO_9P$ (567.70)

1322.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{28}H_{56}NO_9P$ (581.73)

1323.) 1-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{29}H_{58}NO_9P$ (595.75)

1324.) 1-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{30}H_{60}NO_9P$ (609.78)

1325.) 1-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)

$C_{31}H_{62}NO_9P$ (623.81)

1326.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{32}H_{64}NO_9P$ (637.84)

1327.) 1-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{32}H_{64}NO_9P$ (637.84)

1328.) 1-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{33}H_{66}NO_9P$ (651.86)

1329.) 1-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{34}H_{68}NO_9P$ (665.89)

1330.) 1-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{35}H_{70}NO_9P$ (679.92)

1331.) 1-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{36}H_{72}NO_9P$ (693.94)

1332.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{26}H_{50}NO_9P$ (551.66)

1333.) 1-(Z,Z)-5,11-heptadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{27}H_{52}NO_9P$ (565.68)

1334.) 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{28}H_{54}NO_9P$ (579.71)

1335.) 1-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{29}H_{56}NO_9P$ (593.74)

1336.) 1-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{30}H_{58}NO_9P$ (607.77)

1337.) 1-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{31}H_{60}NO_9P$ (621.79)

1338.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{32}H_{62}NO_9P$ (635.82)

1339.) 1-(Z,Z)-10,16-tricosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{33}H_{64}NO_9P$ (649.85)

1340.) 1-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{34}H_{66}NO_9P$ (663.87)

1341.) 1-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{35}H_{68}NO_9P$ (677.90)

1342.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{36}H_{70}NO_9P$ (691.93)

Alkenyl

1343.) 1-O-(Z)-6-hexadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{26}H_{54}NO_8P$ (539.69)

1344.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{28}H_{58}NO_8P$ (567.74)

1345.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)

$C_{30}H_{62}NO_8P$ (595.80)

1346.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{32}H_{66}NO_8P$ (623.85)

1347.) 1-O-(Z)-10-tetracosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{34}H_{70}NO_8P$ (651.91)

1348.) 1-O-(Z)-16-hexacosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{36}H_{74}NO_8P$ (679.96)

1349.) 1-O-(Z,Z)-5,11-hexadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{26}H_{52}NO_8P$ (537.67)

1350.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{28}H_{56}NO_8P$ (565.73)

1351.) 1-O-(Z,Z)-10,16-eicosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{30}H_{60}NO_8P$ (593.78)

1352.) 1-O-(Z,Z)-10,16-docosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{32}H_{64}NO_8P$ (621.84)

1353.) 1-O-(Z,Z)-6,18-tetracosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{34}H_{68}NO_8P$ (649.89)

1354.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{36}H_{72}NO_8P$ (677.94)

n = 3

1355.) 1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{27}H_{54}NO_9P$ (567.70)

1356.) 1-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{28}H_{56}NO_9P$ (581.73)

1357.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{29}H_{58}NO_9P$ (595.75)

1358.) 1-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{31}H_{62}NO_9P$ (623.81)

1359.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{33}H_{66}NO_9P$ (651.86)

1360.) 1-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{33}H_{66}NO_9P$ (651.86)

1361.) 1-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{34}H_{68}NO_9P$ (665.89)

1362.) 1-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{35}H_{70}NO_9P$ (679.92)

1363.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{27}H_{52}NO_9P$ (565.68)

1364.) 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{29}H_{56}NO_9P$ (593.74)

1365.) 1-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{31}H_{60}NO_9P$ (621.79)

1366.) 1-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{32}H_{62}NO_9P$ (635.82)

1367.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{33}H_{64}NO_9P$ (649.85)

1368.) 1-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{35}H_{68}NO_9P$ (677.90)

1369.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{37}H_{72}NO_9P$ (705.95)

1370.) 1-O-(Z)-6-hexadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{27}H_{56}NO_8P$ (553.72)

1371.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{29}H_{60}NO_8P$ (581.77)

1372.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{31}H_{64}NO_8P$ (609.83)

1373.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{33}H_{68}NO_8P$ (637.88)

1374.) 1-O-(Z)-10-tetracosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{35}H_{72}NO_8P$ (665.94)

1375.) 1-O-(Z,Z)-5,11-hexadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{27}H_{54}NO_8P$ (551.7)

1376.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{29}H_{58}NO_8P$ (579.76)

1377.) 1-O-(Z,Z)-10,16-eicosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{31}H_{62}NO_8P$ (607.81)

1378.) 1-O-(Z,Z)-10,16-docosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{33}H_{66}NO_8P$ (635.87)

1379.) 1-O-(Z,Z)-6,18-tetracosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{35}H_{70}NO_8P$ (663.92)

1380.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{37}H_{74}NO_8P$ (691.97)

n = 4

1381.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{30}H_{60}NO_9P$ (609.78)

1382.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{34}H_{68}NO_9P$ (665.89)

1383.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{28}H_{54}NO_9P$ (579.71)

1384.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{34}H_{66}NO_9P$ (663.88)

1385.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{38}H_{74}NO_9P$ (719.98)

1386.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{30}H_{62}NO_8P$ (595.80)

1387.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{34}H_{70}NO_8P$ (651.91)

1388.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{30}H_{60}NO_8P$ (593.78)

1389.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{32}H_{66}NO_8P$ (623.85)

n = 6

1390.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{32}H_{64}NO_9P$ (637.84)

1391.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{36}H_{72}NO_9P$ (693.94)

1392.) 1-(Z,Z)-5-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{30}H_{58}NO_9P$ (607.77)

1393.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexyl-ammonium (n = 6)
$C_{36}H_{70}NO_9P$ (691.93)

1394.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexyl-ammonium (n = 6)
$C_{40}H_{78}NO_9P$ (748.03)

1395.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{32}H_{66}NO_8P$ (623.85)

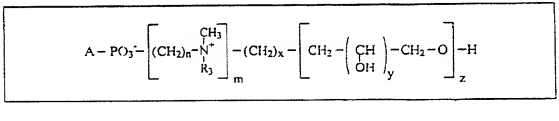
1396.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{36}H_{74}NO_8P$ (679.96)

1397.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexyl-ammonium (n = 6)
$C_{32}H_{64}NO_8P$ (621.84)

1398.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{34}H_{70}NO_8P$ (651.91)

2. Examples of single-chain glycero-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxy-propyl)alkylammonium compounds

(A = III or IV; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 2)



n = 2

1399.) 1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{28}H_{58}NO_{11}P$ (627.75)

1400.) 1-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{32}H_{64}NO_{11}P$ (669.83)

1401.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{70}NO_{11}P$ (711.91)

1402.) 1-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{70}NO_{11}P$ (711.91)

1403.) 1-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{37}H_{74}NO_{11}P$ (739.97)

1404.) 1-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{39}H_{78}NO_{11}P$ (768.02)

1405.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{29}H_{56}NO_{11}P$ (625.74)

1406.) 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{31}H_{60}NO_{11}P$ (653.79)

1407.) 1-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{34}H_{66}NO_{11}P$ (695.87)

1408.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{68}NO_{11}P$ (709.90)

1409.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{39}H_{76}NO_{11}P$ (766.01)

Alkenyl

1410.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{31}H_{64}NO_{10}P$ (641.82)

1411.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{33}H_{68}NO_{10}P$ (669.88)

1412.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{72}NO_{10}P$ (697.93)

1413.) 1-O-(Z)-10-tetracosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{37}H_{76}NO_{10}P$ (725.98)

1414.) 1-O-(Z)-16-hexacosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{39}H_{80}NO_{10}P$ (754.04)

1415.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{31}H_{62}NO_{10}P$ (639.81)

1416.) 1-O-(Z,Z)-6,18-tetracosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{37}H_{74}NO_{10}P$ (723.97)

1417.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{39}H_{78}NO_{10}P$ (752.04)

n = 3

1418.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{32}H_{64}NO_{11}P$ (669.83)

1419.) 1-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{34}H_{68}NO_{11}P$ (697.89)

1420.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{36}H_{72}NO_{11}P$ (725.94)

1421.) 1-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{36}H_{72}NO_{11}P$ (725.94)

1422.) 1-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{38}H_{76}NO_{11}P$ (754.0)

1423.) 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{32}H_{62}NO_{11}P$ (667.83)

1424.) 1-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{34}H_{66}NO_{11}P$ (695.89)

1425.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)

$C_{36}H_{70}NO_{11}P$ (723.94)

1426.) 1-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{38}H_{74}NO_{11}P$ (751.98)

1427.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{40}H_{78}NO_{11}P$ (780.03)

1428.) 1-O-(Z)-6-hexadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{30}H_{62}NO_{10}P$ (627.80)

1429.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{36}H_{74}NO_{10}P$ (711.96)

1430.) 1-O-(Z)-10-tetracosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{38}H_{78}NO_{10}P$ (740.01)

1431.) 1-O-(Z,Z)-5,11-hexadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{30}H_{60}NO_{10}P$ (625.78)

1432.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{32}H_{64}NO_{10}P$ (653.83)

1433.) 1-O-(Z,Z)-10,16-eicosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{34}H_{68}NO_{10}P$ (681.89)

1434.) 1-O-(Z,Z)-6,18-tetracosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{38}H_{76}NO_{10}P$ (738.0)

1435.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{40}H_{80}NO_{10}P$ (766.05)

n = 4

1436.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{33}H_{66}NO_{11}P$ (683.86)

1437.) 1-(Z)-6-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{37}H_{74}NO_{11}P$ (739.97)

1438.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{31}H_{60}NO_{11}P$ (653.79)

1439.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{37}H_{72}NO_{11}P$ (737.95)

1440.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{41}H_{80}NO_{11}P$ (794.06)

1441.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{33}H_{68}NO_{10}P$ (669.88)

1442.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{37}H_{76}NO_{10}P$ (725.98)

1443.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)

$C_{33}H_{66}NO_{10}P$ (667.86)

1444.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{35}H_{72}NO_{10}P$ (697.93)

n = 6

1445.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{35}H_{70}NO_{11}P$ (711.91)

1446.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{39}H_{78}NO_{11}P$ (768.02)

1447.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{33}H_{64}NO_{11}P$ (681.85)

1448.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{39}H_{76}NO_{11}P$ (766.01)

1449.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{43}H_{84}NO_{11}P$ (822.11)

1450.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{35}H_{72}NO_{10}P$ (697.93)

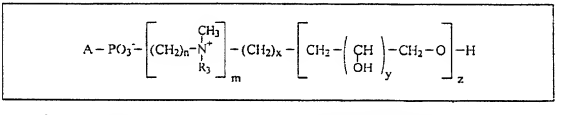
1451.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{39}H_{80}NO_{10}P$ (754.04)

1452.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{35}H_{70}NO_{10}P$ (695.92)

1453.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{37}H_{76}NO_{10}P$ (725.98)

3. Examples of single-chain glycero-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-dihydroxypropyl)alkylammonium compounds

(A = III or IV; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 3)



In the following text, N-(2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-dihydroxypropyl) is abbreviated to N-(HP_1-HP_2-diHP_3)

n = 2

1454.) 1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{32}H_{64}NO_{13}P$ (701.83)

1455.) 1-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{35}H_{70}NO_{13}P$ (743.91)

1456.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{38}H_{76}NO_{13}P$ (785.99)

1457.) 1-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{38}H_{76}NO_{13}P$ (785.99)

1458.) 1-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{42}H_{84}NO_{13}P$ (842.10)

1459.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{32}H_{62}NO_{13}P$ (699.82)

1460.) 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{34}H_{66}NO_{13}P$ (727.87)

1461.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{38}H_{74}NO_{13}P$ (783.98)

1462.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{42}H_{82}NO_{13}P$ (840.09)

Alkenyl

1463.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{34}H_{70}NO_{12}P$ (715.90)

1464.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{36}H_{74}NO_{12}P$ (743.96)

1465.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{38}H_{78}NO_{12}P$ (772.01)

1466.) 1-O-(Z)-16-hexacosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{42}H_{86}NO_{12}P$ (828.12)

1467.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{34}H_{68}NO_{12}P$ (713.89)

1468.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{42}H_{84}NO_{12}P$ (826.10)

n = 3

1469.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{35}H_{70}NO_{13}P$ (743.91)

1470.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{39}H_{78}NO_{13}P$ (800.02)

1471.) 1-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{41}H_{82}NO_{13}P$ (828.07)

1472.) 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{35}H_{68}NO_{13}P$ (741.90)

1473.) 1-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{37}H_{72}NO_{13}P$ (769.95)

1474.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{39}H_{76}NO_{13}P$ (798.01)

1475.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{43}H_{84}NO_{13}P$ (854.11)

1476.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{39}H_{80}NO_{12}P$ (786.04)

1477.) 1-O-(Z)-10-tetracosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{41}H_{84}NO_{12}P$ (814.09)

1478.) 1-O-(Z,Z)-10,16-eicosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{37}H_{74}NO_{12}P$ (812.08)

1479.) 1-O-(Z,Z)-6,18-tetracosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{41}H_{82}NO_{12}P$ (812.08)

1480.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{43}H_{86}NO_{12}P$ (840.13)

n = 4

1481.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{40}H_{80}NO_{13}P$ (814.05)

1482.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butyl-ammonium (n = 4)
$C_{40}H_{78}NO_{13}P$ (812.03)

1483.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butyl-ammonium (n = 4)
$C_{44}H_{86}NO_{13}P$ (868.14)

1484.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{36}H_{74}NO_{12}P$ (743.96)

1485.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{40}H_{82}NO_{12}P$ (800.06)

1486.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{36}H_{72}NO_{12}P$ (741.94)

1487.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{38}H_{78}NO_{12}P$ (772.01)

n = 6

1488.) 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{38}H_{76}NO_{13}P$ (785.99)

1489.) 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{42}H_{84}NO_{13}P$ (842.10)

1490.) 1-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{36}H_{70}NO_{13}P$ (755.92)

1491.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{42}H_{82}NO_{13}P$ (840.09)

1492.) 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{46}H_{90}NO_{13}P$ (896.19)

1493.) 1-O-(Z)-6-octadecenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{38}H_{78}NO_{12}P$ (772.01)

1494.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)
$C_{42}H_{86}NO_{12}P$ (828.12)

1495.) 1-O-(Z,Z)-5,11-octadecadienyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)

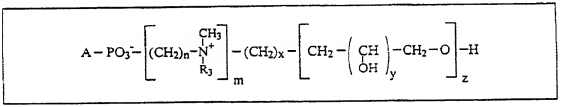
$C_{38}H_{76}NO_{12}P$ (769.99)

1496.) 1-O-(Z)-12-eicosenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)

$C_{40}H_{82}NO_{12}P$ (800.06)

4. Examples of single-chain glycero-phospho compounds not hydroxylated on the nitrogen

(A = III; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1497). 1-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{27}H_{54}NO_7P$ (535.70)

1498). 1-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{31}H_{62}NO_7P$ (591.81)

1499). 1-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{33}H_{66}NO_7P$ (619.86)

1500). 1-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{27}H_{52}NO_7P$ (533.69)

1501). 1-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{29}H_{56}NO_7P$ (561.74)

1502). 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{31}H_{60}NO_7P$ (589.79)

1503). 1-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{35}H_{68}NO_7P$ (645.90)

1504.) 1-O-(Z)-10-docosenyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{31}H_{64}NO_6P$ (577.83)

1505.) 1-O-(Z)-10-tetracosenyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{68}NO_6P$ (605.88)

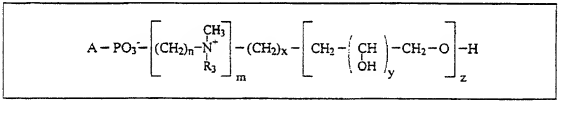
1506.) 1-O-(Z,Z)-10,16-eicosadienyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{58}NO_6P$ (547.76)

1507.) 1-O-(Z,Z)-6,18-tetracosadienyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{66}NO_6P$ (603.86)

1508.) 1-O-(Z,Z)-6,18-hexacosadienyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{70}NO_6P$ (631.92)

5. Examples of ω,ω'-alkanediol-phospho-N,N-dimethyl-N-dihydroxypropylalkylammonium compounds

(A = V; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 1)



1509.) 1-(Z)-10-docosenoyl-ethyleneglycol-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{31}H_{62}NO_8P$ (607.81)

1510.) 1-(Z)-6-octadecenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{28}H_{56}NO_8P$ (565.73)

1511.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{32}H_{64}NO_8P$ (621.84)

1512.) 1-(Z)-10-tetracosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{34}H_{68}NO_8P$ (649.89)

1513.) 1-(Z,Z)-5,11-octadecadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{28}H_{54}NO_8P$ (563.71)

1514.) 1-(Z,Z)-10,16-eicosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{30}H_{58}NO_8P$ (591.77)

1515.) 1-(Z,Z)-10,16-docosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{32}H_{62}NO_8P$ (619.82)

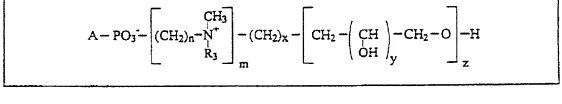
1516.) 1-(Z,Z)-6,18-hexacosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{36}H_{70}NO_8P$ (675.93)

1517.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{33}H_{66}NO_8P$ (635.86)

1518.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{34}H_{68}NO_8P$ (649.89)

6. Examples of alkanediol-(1,2)-phospho-N,N-dimethyl-N-dihydroxypropylalkylammonium compounds

(A = VII; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 1)



1519.) 2-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)

$C_{32}H_{64}NO_8P$ (621.84)

1520.) 1-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)

$C_{32}H_{64}NO_8P$ (621.84)

1521.) 2-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)

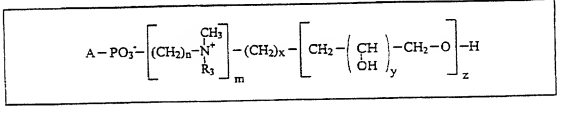
$C_{33}H_{66}NO_8P$ (635.86)

1522.) 1-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)

$C_{34}H_{68}NO_8P$ (649.89)

7. Examples of ω,ω'-alkanediol-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)alkyl-ammonium compounds

(A = V; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 2)



1523.) 1-(Z)-10-docosenoyl-ethyleneglycol-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)

$C_{34}H_{68}NO_{10}P$ (681.89)

1524.) 1-(Z)-6-octadecenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)

$C_{31}H_{62}NO_{10}P$ (639.81)

1525.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)

$C_{35}H_{70}NO_{10}P$ (695.92)

1526.) 1-(Z)-10-tetracosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)

$C_{37}H_{74}NO_{10}P$ (723.97)

1527.) 1-(Z,Z)-5,11-octadecadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{31}H_{60}NO_{10}P$ (637.79)

1528.) 1-(Z,Z)-10,16-eicosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{33}H_{64}NO_{10}P$ (665.85)

1529.) 1-(Z,Z)-10,16-docosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{68}NO_{10}P$ (693.90)

1530.) 1-(Z,Z)-6,18-hexacosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{39}H_{76}NO_{10}P$ (750.01)

1531.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{36}H_{72}NO_{10}P$ (709.94)

1532.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{37}H_{74}NO_{10}P$ (723.96)

1533.) 1-(Z)-10-docosenoyl-butanediol-(1,4)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{37}H_{74}NO_{10}P$ (723.96)

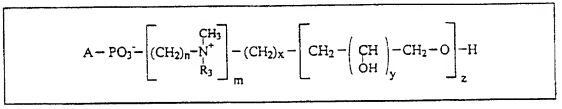
1534.) 1-(Z)-10-docosenoyl-hexanediol-(1,6)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{39}H_{78}NO_{10}P$ (752.02)

1535.) 1-(Z)-10-docosenoyl-octanediol-(1,8)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)

$C_{41}H_{82}NO_{10}P$ (780.07)

8. Examples of alkanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)-alkylammonium compounds

(A = VII; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 2)



1536.) 2-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{70}NO_{10}P$ (695.91)

1537.) 1-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{35}H_{70}NO_{10}P$ (695.91)

1538.) 2-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{36}H_{72}NO_{10}P$ (709.94)

1539.) 1-(Z)-10-docosenoyl-propanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{37}H_{74}NO_{10}P$ (723.97)

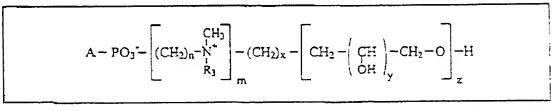
1540.) 1-(Z)-10-docosenoyl-butanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{37}H_{74}NO_{10}P$ (723.97)

1541.) 1-(Z)-10-docosenoyl-hexanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{39}H_{78}NO_{10}P$ (752.02)

1542.) 1-(Z)-10-docosenoyl-octanediol-(1,2)-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{41}H_{82}NO_{10}P$ (780.07)

9. Examples of ω,ω'-alkanediol-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-dihydroxypropyl)alkylammonium compounds

(A = V; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 3)



1543.) 1-(Z)-10-docosenoyl-ethyleneglycol-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{37}H_{74}NO_{12}P$ (755.97)

1544.) 1-(Z)-6-octadecenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{34}H_{68}NO_{12}P$ (713.89)

1545.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{38}H_{76}NO_{12}P$ (769.99)

1546.) 1-(Z)-10-tetracosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{40}H_{80}NO_{12}P$ (798.05)

1547.) 1-(Z,Z)-5,11-octadecadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{34}H_{66}NO_{12}P$ (711.89)

1548.) 1-(Z,Z)-10,16-eicosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{36}H_{70}NO_{12}P$ (739.93)

1549.) 1-(Z,Z)-10,16-docosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{38}H_{74}NO_{12}P$ (767.98)

1550.) 1-(Z,Z)-6,18-hexacosadienoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{42}H_{82}NO_{12}P$ (824.09)

1551.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{39}H_{78}NO_{12}P$ (784.01)

1552.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{40}H_{80}NO_{12}P$ (798.04)

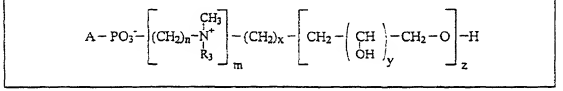
1553.) 1-(Z)-10-docosenoyl-butanediol-(1,4)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{40}H_{80}NO_{12}P$ (798.04)

1554.) 1-(Z)-10-docosenoyl-hexanediol-(1,6)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{42}H_{84}NO_{12}P$ (826.10)

1555.) 1-(Z)-10-docosenoyl-octanediol-(1,8)-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{44}H_{86}NO_{12}P$ (854.16)

10. Examples of alkanediol-phospho compounds not hydroxylated on the nitrogen

(A = V; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1556.) 1-(Z)-10-docosenoyl-ethyleneglycol-phospho-N,N,N-trimethylpropylammonium (n = 3)

$C_{30}H_{60}NO_6P$ (561.78)

1557.) 1-(Z)-6-octadecenoyl-propanediol-(1,3)-phospho-N,N,N-trimethylethylammonium (n = 2)
$C_{26}H_{52}NO_6P$ (505.68)

1558.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N,N-trimethylethylammonium (n = 2)
$C_{30}H_{60}NO_6P$ (561.78)

1559.) 1-(Z)-10-tetracosenoyl-propanediol-(1,3)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{33}H_{66}NO_6P$ (603.86)

1560.) 1-(Z,Z)-5,11-octadecadienoyl-propanediol-(1,3)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{27}H_{52}NO_6P$ (517.69)

1561.) 1-(Z,Z)-10,16-eicosadienoyl-propanediol-(1,3)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{29}H_{56}NO_6P$ (545.74)

1562.) 1-(Z,Z)-10,16-docosadienoyl-propanediol-(1,3)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{60}NO_6P$ (573.79)

1563.) 1-(Z,Z)-6,18-hexacosadienoyl-propanediol-(1,3)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{35}H_{68}NO_6P$ (629.90)

1564.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{31}H_{62}NO_6P$ (575.81)

1565.) 1-(Z)-10-docosenoyl-propanediol-(1,3)-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{32}H_{64}NO_6P$ (589.84)

1566.) 1-(Z)-10-docosenoyl-butanediol-(1,4)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{32}H_{64}NO_6P$ (589.84)

1567.) 1-(Z)-10-docosenoyl-hexanediol-(1,6)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{34}H_{68}NO_6P$ (617.89)

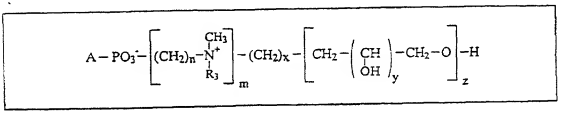
1568.) 1-(Z)-10-docosenoyl-octanediol-(1,8)-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{36}H_{72}NO_6P$ (645.94)

Liposome constituents

Neutral phospholipids

1. Examples of two-chain glycero-phospho-N,N-dimethyl-N-dihydroxypropylalkylammonium compounds

(A = III; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 1)



n = 2

1569.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{42}H_{80}NO_{10}P$ (790.07)

1570.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{44}H_{84}NO_{10}P$ (818.13)

1571.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{46}H_{88}NO_{10}P$ (846.18)

1572.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{48}H_{92}NO_{10}P$ (874.23)

1573.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{50}H_{96}NO_{10}P$ (902.29)

1574.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{52}H_{100}NO_{10}P$ (930.34)

1575.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{54}H_{104}NO_{10}P$ (958.39)

1576.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{54}H_{104}NO_{10}P$ (958.39)

1577.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{56}H_{108}NO_{10}P$ (986.45)

1578.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{58}H_{112}NO_{10}P$ (1014.50)

1579.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{60}H_{116}NO_{10}P$ (1042.56)

1580.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{62}H_{120}NO_{10}P$ (1070.61)

1581.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{42}H_{76}NO_{10}P$ (786.04)

1582.) 1,2-di-(Z,Z)-5,11-heptadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{44}H_{80}NO_{10}P$ (814.09)

1583.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{46}H_{84}NO_{10}P$ (842.15)

1584.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{48}H_{88}NO_{10}P$ (870.20)

1585.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{50}H_{92}NO_{10}P$ (898.25)

1586.) 1,2-di-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{52}H_{96}NO_{10}P$ (926.31)

1587.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{54}H_{100}NO_{10}P$ (955.36)

1588.) 1,2-di-(Z,Z)-10,16-tricosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{56}H_{104}NO_{10}P$ (982.42)

1589.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{58}H_{108}NO_{10}P$ (1010.47)

1590.) 1,2-di-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{60}H_{112}NO_{10}P$ (1038.52)

1591.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{62}H_{116}NO_{10}P$ (1066.58)

1592.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{44}H_{86}NO_{10}P$ (820.14)

1593.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{44}H_{90}NO_{10}P$ (848.20)

1594.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{48}H_{94}NO_{10}P$ (876.25)

1595.) 1-behenyl-2-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{52}H_{102}NO_{10}P$ (932.36)

1596.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxy-propylethylammonium (n = 2)
$C_{44}H_{84}NO_{10}P$ (818.13)

1597.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxy-propylethylammonium (n = 2)
$C_{50}H_{96}NO_{10}P$ (902.29)

1598.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxy-propylethylammonium (n = 2)
$C_{52}H_{100}NO_{10}P$ (930.34)

1599.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethyl-ammonium (n = 2)
$C_{46}H_{90}NO_{10}P$ (848.20)

1600.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{54}H_{104}NO_{10}P$ (958.39)

1601.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{52}H_{98}NO_{10}P$ (928.32)

1602.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylethylammonium (n = 2)
$C_{52}H_{98}NO_{10}P$ (928.32)

n = 3

1603.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{43}H_{82}NO_{10}P$ (804.10)

1604.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{45}H_{86}NO_{10}P$ (832.15)

1605.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{47}H_{90}NO_{10}P$ (860.21)

1606.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{51}H_{98}NO_{10}P$ (916.31)

1607.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{55}H_{106}NO_{10}P$ (972.42)

1608.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{55}H_{106}NO_{10}P$ (972.42)

1609.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{57}H_{110}NO_{10}P$ (1000.47)

1610.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{59}H_{114}NO_{10}P$ (1028.53)

1611.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{47}H_{86}NO_{10}P$ (856.17)

1612.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{51}H_{94}NO_{10}P$ (912.28)

1613.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{55}H_{102}NO_{10}P$ (968.39)

1614.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{63}H_{118}NO_{10}P$ (1080.60)

1615.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{45}H_{88}NO_{10}P$ (834.17)

1616.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{47}H_{92}NO_{10}P$ (862.22)

1617.) 2-(Z)-10-docosenoyl-1-behenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{53}H_{104}NO_{10}P$ (946.38)

1618.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{45}H_{86}NO_{10}P$ (832.15)

1619.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropyl-ammonium (n = 3)
$C_{47}H_{92}NO_{10}P$ (862.22)

1620.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylpropylammonium (n = 3)
$C_{55}H_{106}NO_{10}P$ (972.42)

n = 4

1621.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{48}H_{92}NO_{10}P$ (874.23)

1622.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutylammonium (n = 4)
$C_{56}H_{108}NO_{10}P$ (986.45)

1623.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{44}H_{80}NO_{10}P$ (814.09)

1624.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{56}H_{104}NO_{10}P$ (982.42)

1625.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylbutyl-ammonium (n = 4)
$C_{64}H_{120}NO_{10}P$ (1094.63)

n = 6

1626.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{50}H_{96}NO_{10}P$ (902.29)

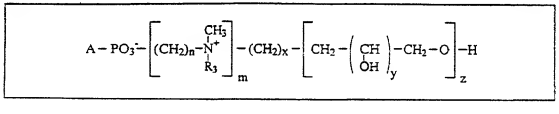
1627.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexylammonium (n = 6)
$C_{58}H_{112}NO_{10}P$ (1014.50)

1628.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexyl-ammonium (n = 6)
$C_{58}H_{108}NO_{10}P$ (1010.47)

1629.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-dihydroxypropylhexyl-ammonium (n = 6)
$C_{66}H_{124}NO_{10}P$ (1122.69)

2. *Examples of two-chain glycero-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)alkylammonium compounds*

(A = III; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 2)



1630.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{45}H_{86}NO_{12}P$ (864.15)

1631.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{47}H_{90}NO_{12}P$ (892.20)

1632.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{49}H_{94}NO_{12}P$ (920.26)

1633.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{51}H_{98}NO_{12}P$ (948.31)

1634.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{53}H_{102}NO_{12}P$ (976.37)

1635.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{55}H_{106}NO_{12}P$ (1004.42)

1636.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{57}H_{110}NO_{12}P$ (1032.47)

1637.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{57}H_{110}NO_{12}P$ (1032.47)

1638.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{59}H_{114}NO_{12}P$ (1060.53)

1639.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{61}H_{118}NO_{12}P$ (1088.58)

1640.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{63}H_{122}NO_{12}P$ (1116.63)

1641.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{65}H_{126}NO_{12}P$ (1144.69)

1642.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{45}H_{82}NO_{12}P$ (860.12)

1643.) 1,2-di-(Z,Z)-5,11-heptadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{47}H_{86}NO_{12}P$ (888.17)

1644.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{49}H_{90}NO_{12}P$ (916.23)

1645.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{51}H_{94}NO_{12}P$ (944.28)

1646.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{53}H_{98}NO_{12}P$ (972.33)

1647.) 1,2-di-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{55}H_{102}NO_{12}P$ (1000.39)

1648.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{57}H_{106}NO_{12}P$ (1028.44)

1649.) 1,2-di-(Z,Z)-10,16-tricosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{59}H_{110}NO_{12}P$ (1056.50)

1650.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{61}H_{114}NO_{12}P$ (1084.55)

1651.) 1,2-di-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{63}H_{118}NO_{12}P$ (1112.60)

1652.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{65}H_{122}NO_{12}P$ (1140.66)

1653.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{47}H_{92}NO_{12}P$ (894.22)

1654.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{49}H_{96}NO_{12}P$ (922.27)

1655.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{51}H_{100}NO_{12}P$ (950.33)

1656.) 1-behenyl-2-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{55}H_{108}NO_{12}P$ (1006.44)

1657.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{47}H_{90}NO_{12}P$ (892.20)

1658.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{53}H_{102}NO_{12}P$ (976.37)

1659.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{55}H_{106}NO_{12}P$ (1004.42)

1660.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{19}H_{96}NO_{12}P$ (922.27)

1661.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)ethylammonium (n = 2)
$C_{57}H_{110}NO_{12}P$ (1032.47)

1662.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)-ethylammonium (n = 2)
$C_{55}H_{104}NO_{12}P$ (1002.40)

1663.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)-ethylammonium (n = 2)
$C_{55}H_{104}NO_{12}P$ (1002.40)

n = 3

1664.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{46}H_{88}NO_{12}P$ (878.18)

1665.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{48}H_{92}NO_{12}P$ (906.23)

1666.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{50}H_{96}NO_{12}P$ (934.29)

1667.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{54}H_{104}NO_{12}P$ (990.39)

1668.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{58}H_{112}NO_{12}P$ (1046.50)

1669.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{58}H_{112}NO_{12}P$ (1046.50)

1670.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{60}H_{116}NO_{12}P$ (1074.55)

1671.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{62}H_{120}NO_{12}P$ (1102.61)

1672.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{50}H_{92}NO_{12}P$ (930.25)

1673.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{54}H_{100}NO_{12}P$ (986.36)

1674.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{58}H_{108}NO_{12}P$ (1042.47)

1675.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{66}H_{124}NO_{12}P$ (1154.68)

1676.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{48}H_{94}NO_{12}P$ (908.25)

1677.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{50}H_{98}NO_{12}P$ (936.30)

1678.) 2-(Z)-10-docosenoyl-1-behenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{56}H_{110}NO_{12}P$ (1020.46)

1679.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{48}H_{92}NO_{12}P$ (906.23)

1680.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{50}H_{98}NO_{12}P$ (936.30)

1681.) 2-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)propylammonium (n = 3)
$C_{58}H_{112}NO_{12}P$ (1046.50)

n = 4

1682.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{51}H_{98}NO_{12}P$ (948.31)

1683.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{59}H_{114}NO_{12}P$ (1060.53)

1684.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{47}H_{86}NO_{12}P$ (888.17)

1685.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{59}H_{110}NO_{12}P$ (1056.50)

1686.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)butylammonium (n = 4)
$C_{67}H_{126}NO_{12}P$ (1168.71)

n = 6

1687.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{53}H_{102}NO_{12}P$ (976.37)

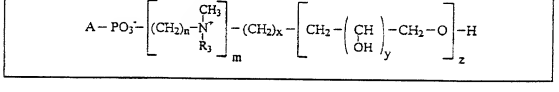
1688.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{61}H_{118}NO_{12}P$ (1088.58)

1689.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{61}H_{114}NO_{12}P$ (1084.55)

1690.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-dihydroxypropyl)hexylammonium (n = 6)
$C_{69}H_{130}NO_{12}P$ (1196.76)

3. Examples of two-chain glycero-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-dihydroxypropyl)alkylammonium compounds

(A = III; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 3)



1691.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{48}H_{92}NO_{14}P$ (938.23)

1692.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{50}H_{96}NO_{14}P$ (966.28)

1693.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{52}H_{100}NO_{14}P$ (994.34)

1694.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{54}H_{104}NO_{14}P$ (1022.39)

1695.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{56}H_{108}NO_{14}P$ (1050.45)

1696.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethyl-ammonium (n = 2)
$C_{58}H_{112}NO_{14}P$ (1078.50)

1697.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{60}H_{116}NO_{14}P$ (1106.55)

1698.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{60}H_{116}NO_{14}P$ (1106.55)

1699.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-diHP$_3$)ethylammonium (n = 2)
$C_{62}H_{120}NO_{14}P$ (1134.61)

1700.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{64}H_{124}NO_{14}P$ (1134.61)

1701.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{66}H_{128}NO_{14}P$ (1190.71)

1702.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{68}H_{132}NO_{14}P$ (1218.77)

1703.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{48}H_{88}NO_{14}P$ (934.20)

1704.) 1,2-di-(Z,Z)-5,11-heptadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{50}H_{92}NO_{14}P$ (962.25)

1705.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{52}H_{96}NO_{14}P$ (990.31)

1706.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{54}H_{100}NO_{14}P$ (1018.36)

1707.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{56}H_{104}NO_{14}P$ (1046.41)

1708.) 1,2-di-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{58}H_{108}NO_{14}P$ (1074.47)

1709.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{60}H_{112}NO_{14}P$ (1102.52)

1710.) 1,2-di-(Z,Z)-10,16-tricosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{62}H_{116}NO_{14}P$ (1130.58)

1711.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{64}H_{120}NO_{14}P$ (1158.63)

1712.) 1,2-di-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{66}H_{124}NO_{14}P$ (1186.68)

1713.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{68}H_{128}NO_{14}P$ (1214.74)

1714.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{50}H_{98}NO_{14}P$ (968.30)

1715.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{52}H_{102}NO_{14}P$ (996.35)

1716.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{54}H_{106}NO_{14}P$ (1024.41)

1717.) 1-behenyl-2-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethyl-ammonium (n = 2)
$C_{58}H_{114}NO_{14}P$ (1080.52)

1718.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{50}H_{96}NO_{14}P$ (966.28)

1719.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{56}H_{108}NO_{14}P$ (1050.45)

1720.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{58}H_{112}NO_{14}P$ (1078.50)

1721.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{52}H_{102}NO_{14}P$ (996.35)

1722.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{60}H_{116}NO_{14}P$ (1106.55)

1723.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{58}H_{110}NO_{14}P$ (1076.48)

1724.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)ethylammonium (n = 2)
$C_{58}H_{110}NO_{14}P$ (1076.48)

n = 3

1725.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{49}H_{94}NO_{14}P$ (952.26)

1726.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)

$C_{51}H_{98}NO_{14}P$ (980.31)

1727.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)

$C_{53}H_{102}NO_{14}P$ (1008.36)

1728.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)

$C_{57}H_{110}NO_{14}P$ (1064.47)

1729.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)

$C_{61}H_{118}NO_{14}P$ (1120.58)

1730.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)

$C_{61}H_{118}NO_{14}P$ (1120.58)

1731.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)

$C_{63}H_{122}NO_{14}P$ (1148.63)

1732.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)

$C_{65}H_{126}NO_{14}P$ (1176.69)

1733.) 1,2-di(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)

$C_{53}H_{98}NO_{14}P$ (1004.33)

1734.) 1,2-di(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)

$C_{57}H_{106}NO_{14}P$ (1060.44)

1735.) 1,2-di(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)

$C_{61}H_{114}NO_{14}P$ (1116.55)

1736.) 1,2-di(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{69}H_{130}NO_{14}P$ (1228.76)

1737.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{51}H_{100}NO_{14}P$ (982.33)

1738.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{53}H_{104}NO_{14}P$ (1010.38)

1739.) 2-(Z)-10-docosenoyl-1-behenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{59}H_{116}NO_{14}P$ (1094.54)

1740.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{51}H_{98}NO_{14}P$ (980.31)

1741.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propyl-ammonium (n = 3)
$C_{53}H_{104}NO_{14}P$ (1010.38)

1742.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)propylammonium (n = 3)
$C_{61}H_{118}NO_{14}P$ (1120.58)

n = 4

1743.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)
$C_{54}H_{104}NO_{14}P$ (1022.39)

1744.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butylammonium (n = 4)

$C_{62}H_{120}NO_{14}P$ (1134.61)

1745.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butyl-ammonium (n = 4)

$C_{50}H_{92}NO_{14}P$ (962.25)

1746.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butyl-ammonium (n = 4)

$C_{62}H_{116}NO_{14}P$ (1130.58)

1747.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)butyl-ammonium (n = 4)

$C_{70}H_{132}NO_{14}P$ (1242.79)

n = 6

1748.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)

$C_{56}H_{108}NO_{14}P$ (1050.45)

1749.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexylammonium (n = 6)

$C_{64}H_{124}NO_{14}P$ (1162.66)

1750.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexyl-ammonium (n = 6)

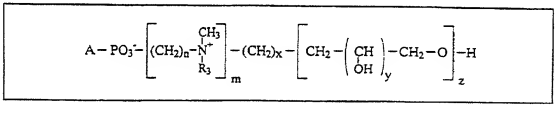
$C_{64}H_{120}NO_{14}P$ (1158.63)

1751.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-diHP_3)hexyl-ammonium (n = 6)

$C_{72}H_{136}NO_{14}P$ (1270.84)

4. Examples of two-chain glycero-phospho-N,N-dimethyl-N-(2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-dihydroxypropyl)alkylammonium compounds

(A = III; n = 2-6; R_3, CH_3; m = 1, x = 0; y = 1; z = 4)



In the following text, N-(2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-2-hydroxypropyl-3,1-O,O-dihydroxypropyl) is abbreviated to N-(HP_1-HP_2-HP_3-diHP_4).

1752.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{51}H_{98}NO_{16}P$ (1012.31)

1753.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethyl-ammonium (n = 2)
$C_{53}H_{102}NO_{16}P$ (1040.36)

1754.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{55}H_{106}NO_{16}P$ (1068.42)

1755.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{57}H_{110}NO_{16}P$ (1096.47)

1756.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{59}H_{114}NO_{16}P$ (1124.53)

1757.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethyl-ammonium (n = 2)
$C_{61}H_{118}NO_{16}P$ (1152.58)

1758.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethylammonium (n = 2)
$C_{63}H_{122}NO_{16}P$ (1180.63)

1759.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethylammonium (n = 2)
$C_{63}H_{122}NO_{16}P$ (1180.63)

1760.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethylammonium (n = 2)
$C_{65}H_{126}NO_{16}P$ (1208.69)

1761.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethyl-ammonium (n = 2)
$C_{67}H_{130}NO_{16}P$ (1236.74)

1762.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethyl-ammonium (n = 2)
$C_{69}H_{134}NO_{16}P$ (1264.79)

1763.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethyl-ammonium (n = 2)
$C_{71}H_{138}NO_{16}P$ (1292.85)

1764.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethyl-ammonium (n = 2)
$C_{51}H_{94}NO_{16}P$ (1008.28)

1765.) 1,2-di-(Z,Z)-5,11-heptadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethylammonium (n = 2)
$C_{53}H_{98}NO_{16}P$ (1036.33)

1766.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP$_1$-HP$_2$-HP$_3$-diHP$_4$)ethyl-ammonium (n = 2)
$C_{55}H_{102}NO_{16}P$ (1064.39)

1767.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{57}H_{106}NO_{16}P$ (1092.44)

1768.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{59}H_{110}NO_{16}P$ (1120.49)

1769.) 1,2-di-(Z,Z)-10,16-heneicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{61}H_{114}NO_{16}P$ (1148.55)

1770.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{63}H_{118}NO_{16}P$ (1176.60)

1771.) 1,2-di-(Z,Z)-10,16-tricosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{65}H_{122}NO_{16}P$ (1204.65)

1772.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{67}H_{126}NO_{16}P$ (1232.71)

1773.) 1,2-di-(Z,Z)-10,6-pentacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{69}H_{130}NO_{16}P$ (1260.76)

1774.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{71}H_{134}NO_{16}P$ (1288.82)

1775.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{53}H_{104}NO_{16}P$ (1042.38)

1776.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{55}H_{108}NO_{16}P$ (1070.43)

1777.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{57}H_{112}NO_{16}P$ (1098.49)

1778.) 1-behenyl-2-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{61}H_{120}NO_{16}P$ (1154.59)

1779.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{53}H_{102}NO_{16}P$ (1040.36)

1780.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{59}H_{114}NO_{16}P$ (1124.53)

1781.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{61}H_{118}NO_{16}P$ (1152.58)

1782.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{55}H_{108}NO_{16}P$ (1070.43)

1783.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{63}H_{122}NO_{16}P$ (1180.63)

1784.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{61}H_{116}NO_{16}P$ (1150.56)

1785.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)ethylammonium (n = 2)
$C_{61}H_{116}NO_{16}P$ (1150.56)

n = 3

1786.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{52}H_{100}NO_{16}P$ (1026.34)

1787.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{54}H_{104}NO_{16}P$ (1054.39)

1788.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{56}H_{108}NO_{16}P$ (1082.44)

1789.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{60}H_{116}NO_{16}P$ (1138.55)

1790.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{64}H_{124}NO_{16}P$ (1194.66)

1791.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{64}H_{124}NO_{16}P$ (1194.66)

1792.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{66}H_{128}NO_{16}P$ (1222.71)

1793.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{68}H_{132}NO_{16}P$ (1250.77)

1794.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{56}H_{104}NO_{16}P$ (1078.41)

1795.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{60}H_{112}NO_{16}P$ (1134.52)

1796.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{64}H_{120}NO_{16}P$ (1190.63)

1797.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{72}H_{136}NO_{16}P$ (1302.84)

1798.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{54}H_{106}NO_{16}P$ (1056.41)

1799.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{56}H_{110}NO_{16}P$ (1084.46)

1800.) 2-(Z)-10-docosenoyl-1-behenyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{62}H_{122}NO_{16}P$ (1168.62)

1801.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{54}H_{104}NO_{16}P$ (1054.39)

1802.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)-propylammonium (n = 3)
$C_{56}H_{110}NO_{16}P$ (1084.46)

1803.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)propylammonium (n = 3)
$C_{64}H_{124}NO_{16}P$ (1194.66)

n = 4

1804.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)butylammonium (n = 4)
$C_{57}H_{110}NO_{16}P$ (1096.47)

1805.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)butylammonium (n = 4)
$C_{65}H_{126}NO_{16}P$ (1208.69)

1806.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)butyl-ammonium (n = 4)
$C_{53}H_{98}NO_{16}P$ (1036.33)

1807.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)butyl-ammonium (n = 4)
$C_{65}H_{122}NO_{16}P$ (1204.65)

1808.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)butyl-ammonium (n = 4)
$C_{73}H_{138}NO_{16}P$ (1316.87)

n = 6

1809.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)hexylammonium (n = 6)
$C_{59}H_{114}NO_{16}P$ (1124.53)

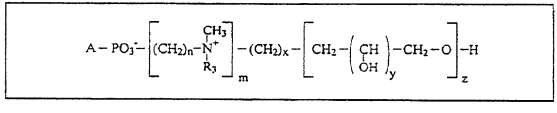
1810.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)hexylammonium (n = 6)
$C_{67}H_{130}NO_{16}P$ (1236.74)

1811.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)hexylammonium (n = 6)
$C_{67}H_{126}NO_{16}P$ (1232.71)

1812.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N-dimethyl-N-(HP_1-HP_2-HP_3-diHP_4)hexylammonium (n = 6)
$C_{75}H_{142}NO_{16}P$ (1344.92)

5. Examples of two-chain glycero-phospho compounds not hydroxylated on the nitrogen

(A = III; n = 2-6; R_3, CH_3; m = 1, x = 1; z = 0)



1813.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{41}H_{78}NO_8P$ (744.05)

1814.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{43}H_{82}NO_8P$ (772.10)

1815.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{45}H_{86}NO_8P$ (800.15)

1816.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{49}H_{94}NO_8P$ (856.26)

1817.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{53}H_{102}NO_8P$ (912.37)

1818.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{53}H_{102}NO_8P$ (912.37)

1819.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{55}H_{106}NO_8P$ (940.42)

1820.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{57}H_{110}NO_8P$ (968.48)

1821.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{45}H_{82}NO_8P$ (796.12)

1822.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{49}H_{90}NO_8P$ (852.23)

1823.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{53}H_{98}NO_8P$ (908.34)

1824.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{61}H_{114}NO_8P$ (1020.55)

1825.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{43}H_{84}NO_8P$ (774.12)

1826.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{45}H_{88}NO_8P$ (802.17)

1827.) 2-(Z)-10-docosenoyl-1-behenyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{51}H_{100}NO_8P$ (886.33)

1828.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{43}H_{82}NO_8P$ (772.10)

1829.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{45}H_{88}NO_8P$ (802.17)

1830.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-N,N,N-trimethylpropylammonium (n = 3)
$C_{53}H_{102}NO_8P$ (912.37)

n = 4

1831.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{46}H_{88}NO_8P$ (814.18)

1832.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{54}H_{104}NO_8P$ (926.40)

1833.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{42}H_{76}NO_8P$ (796.12)

1834.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{54}H_{100}NO_8P$ (922.36)

1835.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylbutylammonium (n = 4)
$C_{62}H_{116}NO_8P$ (1034.58)

n = 6

1836.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylhexylammonium (n = 6)
$C_{48}H_{92}NO_8P$ (842.23)

1837.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-N,N,N-trimethylhexylammonium (n = 6)
$C_{56}H_{108}NO_8P$ (954.45)

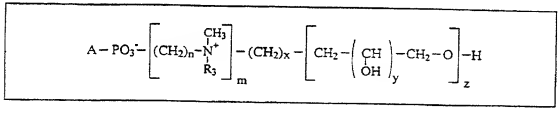
1838.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylhexylammonium (n = 6)
$C_{56}H_{104}NO_8P$ (950.42)

1839.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-N,N,N-trimethylhexylammonium (n = 6)
$C_{64}H_{120}NO_8P$ (1062.63)

Negatively charged phospholipids: **Phosphatidyloligoglycerols**

6. Examples of glycero-glycerols (Na salts of phospho-G_3-G_2 compounds)

(A = III; m = 0; y = 1; z = 2)



1840.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{41}H_{76}NaO_{12}P$ (815.01)

1841.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{43}H_{80}NaO_{12}P$ (843.06)

1842.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{45}H_{84}NaO_{12}P$ (871.12)

1843.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{47}H_{88}NaO_{12}P$ (899.17)

1844.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{49}H_{92}NaO_{12}P$ (927.23)

1845.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{51}H_{96}NaO_{12}P$ (955.28)

1846.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{12}P$ (983.33)

1847.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{12}P$ (983.33)

1848.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{55}H_{104}NaO_{12}P$ (1011.39)

1849.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt

$C_{57}H_{108}NaO_{12}P$ (1039.44)

1850.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{12}P$ (1067.49)

1851.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{61}H_{116}NaO_{12}P$ (1095.55)

1852.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{41}H_{72}NaO_{12}P$ (810.98)

1853.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{45}H_{80}NaO_{12}P$ (867.09)

1854.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{47}H_{84}NaO_{12}P$ (895.14)

1855.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{49}H_{88}NaO_{12}P$ (923.19)

1856.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{53}H_{96}NaO_{12}P$ (979.30)

1857.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{57}H_{104}NaO_{12}P$ (1035.41)

1858.) 1,2-di-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{59}H_{108}NaO_{12}P$ (1063.46)

1859.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{61}H_{112}NaO_{12}P$ (1091.52)

1860.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{43}H_{82}NaO_{12}P$ (845.08)

1861.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt

$C_{45}H_{86}NaO_{12}P$ (873.13)

1862.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{47}H_{90}NaO_{12}P$ (901.19)

1863.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{43}H_{80}NaO_{12}P$ (843.06)

1864.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{49}H_{92}NaO_{12}P$ (927.23)

1865.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{51}H_{96}NaO_{12}P$ (955.28)

1866.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{45}H_{86}NaO_{12}P$ (873.13)

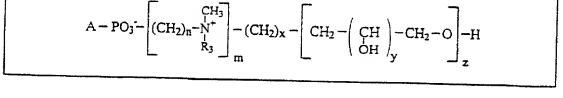
1867.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{12}P$ (983.33)

1868.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{51}H_{94}NaO_{12}P$ (953.26)

1869.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycerol; Na salt
$C_{51}H_{94}NaO_{12}P$ (953.26)

7. *Examples of phosphatidyl-glycero-glycero-glycerols (Na salts of phospho-G_1-G_2-G_3 compounds)*

(A = III; m = 0, x = 0; y = 1; z = 3)



1870.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{44}H_{82}NaO_{14}P$ (889.09)

1871.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{46}H_{86}NaO_{14}P$ (917.14)

1872.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{48}H_{90}NaO_{14}P$ (945.20)

1873.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{50}H_{94}NaO_{14}P$ (973.25)

1874.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{52}H_{98}NaO_{14}P$ (1001.31)

1875.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{54}H_{102}NaO_{14}P$ (1029.36)

1876.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{56}H_{106}NaO_{14}P$ (1057.41)

1877.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{56}H_{106}NaO_{14}P$ (1057.41)

1878.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{58}H_{110}NaO_{14}P$ (1085.47)

1879.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{60}H_{114}NaO_{14}P$ (1113.52)

1880.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{62}H_{118}NaO_{14}P$ (1141.57)

1881.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{64}H_{122}NaO_{14}P$ (1169.63)

1882.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{44}H_{78}NaO_{14}P$ (885.06)

1883.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{48}H_{86}NaO_{14}P$ (941.17)

1884.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{50}H_{90}NaO_{14}P$ (969.22)

1885.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{52}H_{94}NaO_{14}P$ (997.27)

1886.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{56}H_{102}NaO_{14}P$ (1053.38)

1887.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{60}H_{110}NaO_{14}P$ (1109.49)

1888.) 1,2-di-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{62}H_{114}NaO_{14}P$ (1137.54)

1889.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{64}H_{118}NaO_{14}P$ (1165.60)

1890.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{46}H_{88}NaO_{14}P$ (919.16)

1891.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{48}H_{92}NaO_{14}P$ (947.21)

1892.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{50}H_{96}NaO_{14}P$ (975.27)

1893.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{46}H_{86}NaO_{14}P$ (917.14)

1894.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{52}H_{98}NaO_{14}P$ (1001.31)

1895.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{54}H_{102}NaO_{14}P$ (1029.36)

1896.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{48}H_{92}NaO_{14}P$ (947.21)

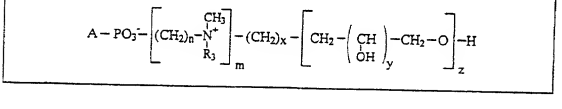
1897.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{56}H_{106}NaO_{14}P$ (1057.41)

1898.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{54}H_{100}NaO_{14}P$ (1027.34)

1899.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycerol; Na salt
$C_{54}H_{100}NaO_{14}P$ (1027.34)

8. Examples of phosphatidyl-glycero-glycero-glycero-glycerols (Na salts of phospho-G_1-G_2-G_3-G_4 compounds

(A = III; m = 0, x = 0; y = 1; z = 4)



1900.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{47}H_{88}NaO_{16}P$ (963.17)

1901.) 1,2-di-(Z)-10-heptadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{49}H_{92}NaO_{16}P$ (991.22)

1902.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{96}NaO_{16}P$ (1019.28)

1903.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{16}P$ (1047.33)

1904.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{55}H_{104}NaO_{16}P$ (1075.38)

1905.) 1,2-di-(Z)-10-heneicosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{57}H_{108}NaO_{16}P$ (1103.44)

1906.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{16}P$ (1131.49)

1907.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{16}P$ (1131.49)

1908.) 1,2-di-(Z)-10-tricosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{61}H_{116}NaO_{16}P$ (1159.55)

1909.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{63}H_{120}NaO_{16}P$ (1187.60)

1910.) 1,2-di-(Z)-15-pentacosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{65}H_{124}NaO_{16}P$ (1215.65)

1911.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{67}H_{128}NaO_{16}P$ (1243.71)

1912.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{47}H_{84}NaO_{16}P$ (959.14)

1913.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{92}NaO_{16}P$ (1015.25)

1914.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{53}H_{96}NaO_{16}P$ (1043.30)

1915.) 1,2-di-(Z,Z)-10,16-eicosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{55}H_{100}NaO_{16}P$ (1071.35)

1916.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{108}NaO_{16}P$ (1127.46)

1917.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{63}H_{116}NaO_{16}P$ (1183.57)

1918.) 1,2-di-(Z,Z)-10,16-pentacosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{65}H_{120}NaO_{16}P$ (1211.62)

1919.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{67}H_{124}NaO_{16}P$ (1239.68)

1920.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{49}H_{94}NaO_{16}P$ (993.24)

1921.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{98}NaO_{16}P$ (1021.29)

1922.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{53}H_{102}NaO_{16}P$ (1049.35)

1923.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{49}H_{92}NaO_{16}P$ (991.22)

1924.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{55}H_{104}NaO_{16}P$ (1075.38)

1925.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{57}H_{108}NaO_{16}P$ (1103.44)

1926.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{98}NaO_{16}P$ (1021.29)

1927.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{16}P$ (1131.49)

1928.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{57}H_{106}NaO_{16}P$ (1101.42)

1929.) 1-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-glycero-glycero-glycero-glycerol; Na salt
$C_{57}H_{106}NaO_{16}P$ (1101.42)

9. Examples of phospho-sn-G_1 linkages

sn-1-G_1-G_2 compounds

1930.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{45}H_{84}NaO_{12}P$ (871.12)

1931.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{47}H_{88}NaO_{12}P$ (899.17)

1932.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{12}P$ (983.33)

1933.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{12}P$ (983.33)

1934.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{57}H_{108}NaO_{12}P$ (1039.44)

1935.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{61}H_{116}NaO_{12}P$ (1095.55)

1936.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{45}H_{80}NaO_{12}P$ (867.09)

1937.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{53}H_{96}NaO_{12}P$ (979.30)

1938.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{57}H_{104}NaO_{12}P$ (1035.41)

1939.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{61}H_{112}NaO_{12}P$ (1091.52)

1940.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt

$C_{45}H_{86}NaO_{12}P$ (873.13)

1941.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{47}H_{90}NaO_{12}P$ (901.19)

1942.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{43}H_{80}NaO_{12}P$ (843.06)

1943.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{49}H_{92}NaO_{12}P$ (927.23)

1944.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{12}P$ (983.33)

<u>*sn*-1-G_1-G_2-G_3 compounds</u>

1945.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{48}H_{90}NaO_{14}P$ (945.20)

1946.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{50}H_{94}NaO_{14}P$ (973.25)

1947.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{56}H_{106}NaO_{14}P$ (1057.41)

1948.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{56}H_{106}NaO_{14}P$ (1057.41)

1949.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{60}H_{114}NaO_{14}P$ (1113.52)

1950.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{64}H_{122}NaO_{14}P$ (1169.63)

1951.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{48}H_{86}NaO_{14}P$ (941.17)

1952.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{56}H_{102}NaO_{14}P$ (1053.38)

1953.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{60}H_{110}NaO_{14}P$ (1109.49)

1954.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{64}H_{118}NaO_{14}P$ (1165.60)

1955.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{48}H_{92}NaO_{14}P$ (947.21)

1956.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{50}H_{96}NaO_{14}P$ (975.27)

1957.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{46}H_{86}NaO_{14}P$ (917.14)

1958.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{52}H_{98}NaO_{14}P$ (1001.31)

1959.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycerol; Na salt
$C_{56}H_{106}NaO_{14}P$ (1057.41)

<u>*sn*-1-G_1-G_2-G_3-G_4 compounds</u>

1960.) 1,2-di-(Z)-6-octadecenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{96}NaO_{16}P$ (1019.28)

1961.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{53}H_{100}NaO_{16}P$ (1047.33)

1962.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{16}P$ (1131.49)

1963.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{16}P$ (1131.49)

1964.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{63}H_{120}NaO_{16}P$ (1187.60)

1965.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{67}H_{128}NaO_{16}P$ (1243.71)

1966.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{92}NaO_{16}P$ (1015.25)

1967.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{108}NaO_{16}P$ (1127.46)

1968.) 1,2-di-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{63}H_{116}NaO_{16}P$ (1183.57)

1969.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{67}H_{124}NaO_{16}P$ (1239.68)

1970.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{51}H_{98}NaO_{16}P$ (1021.29)

1971.) 2-(Z)-10-eicosenoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{53}H_{102}NaO_{16}P$ (1049.35)

1972.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{49}H_{92}NaO_{16}P$ (991.22)

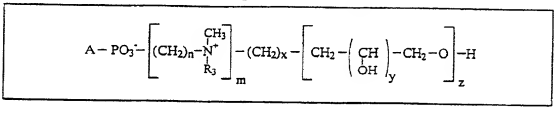
1973.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{55}H_{104}NaO_{16}P$ (1075.38)

1974.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-*sn*-1-glycero-glycero-glycero-glycerol; Na salt
$C_{59}H_{112}NaO_{16}P$ (1131.49)

Linkages with sugar alcohols

10. Phospho-D-mannitol compounds

(A = III; m = 0, x = 0; y = 4; z = 1)



1975.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{41}H_{76}NaO_{13}P$ (831.01)

1976.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{47}H_{88}NaO_{13}P$ (915.17)

1977.) 1,2-di-(Z)-12-eicosenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{49}H_{92}NaO_{13}P$ (943.23)

1978.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{53}H_{100}NaO_{13}P$ (999.33)

1979.) 1,2-di-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{53}H_{100}NaO_{13}P$ (999.33)

1980.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{57}H_{108}NaO_{13}P$ (1055.44)

1981.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{61}H_{116}NaO_{13}P$ (1111.55)

1982.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{41}H_{72}NaO_{13}P$ (826.98)

1983.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{45}H_{80}NaO_{13}P$ (883.09)

1984.) 1,2-di-(Z,Z)-6,12-nonadecadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{47}H_{84}NaO_{13}P$ (911.14)

1985.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{53}H_{96}NaO_{13}P$ (995.30)

1986.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{61}H_{112}NaO_{13}P$ (1107.52)

1987.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{43}H_{82}NaO_{13}P$ (861.08)

1988.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{45}H_{86}NaO_{13}P$ (889.13)

1989.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{43}H_{80}NaO_{13}P$ (859.06)

1990.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{49}H_{92}NaO_{13}P$ (943.23)

1991.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{51}H_{96}NaO_{13}P$ (971.28)

1992.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{45}H_{86}NaO_{13}P$ (889.13)

1993.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{53}H_{100}NaO_{13}P$ (999.33)

1994.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{51}H_{94}NaO_{13}P$ (969.26)

1995.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{51}H_{94}NaO_{13}P$ (969.26)

1996.) 1-(Z)-12-docosenoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{31}H_{60}NaO_{12}P$ (678.77)

1997.) 1-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-D-mannitol; Na salt
$C_{31}H_{58}NaO_{12}P$ (676.76)

1998.) 1-(Z)-12-docosenyl-phospho-D-mannitol; Na salt
$C_{28}H_{56}NaO_9P$ (590.71)

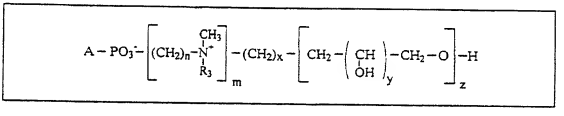
1999.) 1-(Z.Z)-10,16-docosadienyl-phospho-D-mannitol; Na salt
$C_{28}H_{54}NaO_9P$ (588.69)

2000.) 1-O-(Z)-10-docosenyl-2-O-methyl-sn-glycero-3-phospho-D-mannitol; Na salt
$C_{32}H_{64}NaO_{11}P$ (678.82)

2001.) 1-O-(Z,Z)-10,16-docosadienyl-2-O-methyl-sn-glycero-3-phospho-D-mannitol; Na salt
$C_{32}H_{62}NaO_{11}P$ (676.80)

11. Phospho-D-lyxitol compounds

(A = III; m = 0, x = 0; y = 3; z = 1)



2002.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{40}H_{74}NaO_{12}P$ (800.98)

2003.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{46}H_{86}NaO_{12}P$ (885.15)

2004.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{52}H_{98}NaO_{12}P$ (969.31)

2005.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{56}H_{106}NaO_{12}P$ (1025.41)

2006.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{60}H_{114}NaO_{12}P$ (1081.52)

2007.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{40}H_{70}NaO_{12}P$ (796.95)

2008.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{44}H_{78}NaO_{12}P$ (853.06)

2009.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{52}H_{94}NaO_{12}P$ (965.27)

2010.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{60}H_{110}NaO_{12}P$ (1077.49)

2011.) 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{42}H_{80}NaO_{12}P$ (831.05)

2012.) 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{44}H_{84}NaO_{12}P$ (859.11)

2013.) 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{42}H_{78}NaO_{12}P$ (829.04)

2014.) 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{48}H_{90}NaO_{12}P$ (913.20)

2015.) 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{50}H_{94}NaO_{12}P$ (941.25)

2016.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{44}H_{84}NaO_{12}P$ (859.11)

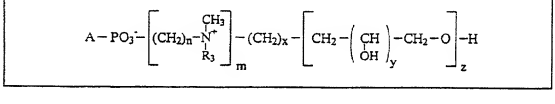
2017.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{52}H_{98}NaO_{12}P$ (969.31)

2018.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{50}H_{92}NaO_{12}P$ (939.24)

2019.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-lyxitol; Na salt
$C_{50}H_{92}NaO_{12}P$ (939.24)

12. Phospho-D-threitol compounds

(A = III; m = 0, x = 0; y = 2; z = 1)



2020.) 1,2-di-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{39}H_{72}NaO_{11}P$ (770.96)

2021.) 1,2-di-(Z)-6-nonadecenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{45}H_{84}NaO_{11}P$ (855.12)

2022.) 1,2-di-(Z)-10-docosenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{51}H_{96}NaO_{11}P$ (939.28)

2023.) 1,2-di-(Z)-10-tetracosenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{55}H_{104}NaO_{11}P$ (995.39)

2024.) 1,2-di-(Z)-16-hexacosenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{59}H_{112}NaO_{11}P$ (1051.50)

2025.) 1,2-di-(Z,Z)-5,11-hexadecadienoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{39}H_{68}NaO_{11}P$ (766.93)

2026.) 1,2-di-(Z,Z)-5,11-octadecadienoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{43}H_{76}NaO_{11}P$ (823.03)

2027.) 1,2-di-(Z,Z)-10,16-docosadienoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{51}H_{92}NaO_{11}P$ (935.25)

2028.) 1,2-di-(Z,Z)-6,18-hexacosadienoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{59}H_{108}NaO_{11}P$ (1047.46)

2029). 2-(Z)-6-hexadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{41}H_{78}NaO_{11}P$ (801.03)

2030). 2-(Z)-10-octadecenoyl-1-stearoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{43}H_{82}NaO_{11}P$ (829.08)

2031). 2-(Z,Z)-6,12-hexadecadienoyl-1-stearoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{41}H_{76}NaO_{11}P$ (799.01)

2032). 2-(Z,Z)-10,16-docosadienoyl-1-stearoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{47}H_{88}NaO_{11}P$ (883.17)

2033). 1-stearoyl-2-(Z,Z)-6,18-tetracosadienoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{49}H_{92}NaO_{11}P$ (911.23)

2034.) 1-(Z)-10-octadecenoyl-2-stearoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{43}H_{82}NaO_{11}P$ (829.08)

2035.) 1-(Z,Z)-6,18-hexacosadienoyl-2-stearoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{51}H_{96}NaO_{11}P$ (939.28)

2036.) 1-(Z,Z)-6,18-hexacosadienoyl-2-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{49}H_{90}NaO_{11}P$ (909.21)

2037.) 2-(Z,Z)-6,18-hexacosadienoyl-1-(Z)-6-hexadecenoyl-*sn*-glycero-3-phospho-D-threitol; Na salt
$C_{49}H_{90}NaO_{11}P$ (909.21)

Sources:

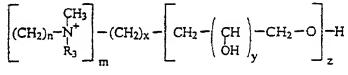
[1] Kaufmann-Kolle, P., Berger M.R., Unger, C. and H. Eibl
Systemic administration of alkylphosphocholines: Erucylphosphocholine and liposomal hexadecylphosphocholine
Adv. Exp. Med. Bio. 416, 165-168 (1996)

Patent Claims

1. A compound of the general formula (I)

(I) $A - PO_3^- - B$

in which B is a radical of the general formula (II)

(II) 

in which

n is an integer from 2 to 8;

m is 0, 1 or 2;

x is an integer from 0 to 8;

y is an integer from 1 to 4;

z is an integer from 0 to 5;

R_3 is an alkyl radical having 1 to 3 C atoms, which may be substituted by one or more hydroxyl groups;

and in which A is a radical selected from one of the formulae (III) to (IX):

(III) 

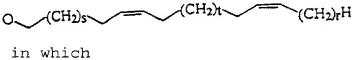
(IV) 

(V) 

(VI) 

(VII) 

(VIII) 

(IX) 

in which

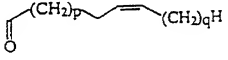
g is an integer from 0 to 8;

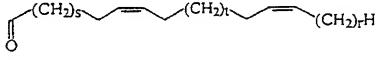
p, q, r, s, t ≥ 0;

$12 \leq p + q \leq 30$ and

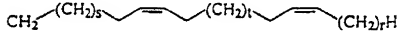
$8 \leq s + t + r \leq 26$;

where R_1 and R_2 are each independently hydrogen, a saturated or unsaturated acyl or alkyl radical or a radical selected from one of the formulae (X), (XI), (XII) and (XIII), and at least one of R_1 and R_2 is a radical selected from one of the formulae (X), (XI), (XII) and (XIII):

(X) 

(XI) 

(XII) 

(XIII) 

where $q \neq 8$ for $p + q = 14$, 16, 18 or 20, if neither of the radicals R_1 and R_2 is a radical of the formula (XI) or (XIII), or if A is a radical of the formula (VIII).

2. A compound as claimed in claim 1, in which the following applies to B:
m = 1.

3. A compound as claimed in claim 2, in which the following applies to B:
m = 1;
x = 1 to 3;
z = 0.

4. A compound as claimed in claim 3, in which the following applies to B:
m = 1;
x = 1;

z = 0.

5. A compound as claimed in claim 1, in which the following applies to B:
m = 1;
x = 0;
y = 1;
z = 1 to 5.

6. A compound as claimed in claim 5, in which the following applies to B:
m = 1;
x = 0;
y = 1;
z = 1 to 3.

7. A compound as claimed in claim 1, in which the following applies to B:
m = 1;
x = 0;
y = 2 to 4;
z = 1.

8. A compound as claimed in claim 1, in which the following applies to B:
m = 0;
x = 0;
y = 1;
z = 1 to 5.

9. A compound as claimed in claim 1, in which the following applies to B:
m = 0;
x = 0;
y = 2 to 4;
z = 1.

10. A compound as claimed in any of the preceding claims, in which the following applies to B:
$R_3 = CH_3$.

11. A compound as claimed in any of claims 1 to 9, in which the following applies to B:
R_3 = 1,2-dihydroxypropyl.

12. A compound as claimed in any of the preceding claims, in which the following applies to B:
n = 2 to 6.

13. A compound as claimed in any of the preceding claims, in which the following applies to B:
n = 3.

14. A compound as claimed in any of the preceding claims, in which A is a radical of the formula (VIII) or (IX).

15. A compound as claimed in claim 14, in which A is a radical of the formula (VIII) and has 16 to 23 carbon atoms.

16. A compound as claimed in claim 14, in which A is a radical of the formula (IX) and has 19 to 26 carbon atoms.

17. A compound as claimed in claim 16, in which A is a radical of the formula (IX) and has 19 to 26 carbon atoms, and r = 0.

18. A compound as claimed in any of claims 1 to 13, in which A is a radical selected from one of the formulae (III) to (VII), and R_1 and R_2 are each independently a radical selected from one of the formulae (X) to (XIII).

19. A compound as claimed in claim 18, in which the following applies to B:
$x = 1$ and $z = 0$.

20. A compound as claimed in claim 18 or 19, in which A is a radical of the formula (III) or (IV), and R_1 and R_2 are each independently a radical selected from one of the formulae (X) to (XIII), where one of R_1 and R_2 has 16 to 32 carbon atoms and one of R_1 and R_2 has 16 to 26 carbon atoms.

21. A compound as claimed in claim 18 or 19, in which A is a radical of the formula (III) or (IV), and R_1 and R_2 are both a radical selected from one of the formulae (X) to (XIII) and have 16 to 26 carbon atoms.

22. A compound as claimed in claim 18 or 19, in which A is a radical of the formula (III) or (IV), and R_1 and R_2 are each independently a radical of the formulae (X) to (XIII) and have 16 to 24 carbon atoms.

23. A compound as claimed in any of claims 18 to 22, in which R_1 and R_2 are each independently a radical of the formula (X) or (XI).

24. A compound as claimed in any of claims 18 to 22, in which R_1 and R_2 are each independently a radical of the formula (XII) or (XIII).

25. A compound as claimed in claim 18, 19, 21 or 23, in which R_1 and R_2 are both a radical of the formula (XI).

26. A compound as claimed in claim 18, 19, 21 or 24, in which R_1 and R_2 are both a radical of the formula (XIII).

27. A compound as claimed in claim 18 or 19, in which A is a radical of the formula (III) or (IV), and one of R_1 and R_2 is an alkyl radical having 1 to 4 carbon atoms.

28. A compound as claimed in claim 18 or 19, in which A is a radical selected from one of the formulae (III) or (IV), and one of R_1 and R_2 is a hydrogen radical.

29. Liposomes which comprise as liposome shell constituents phospholipids and/or alkylphospholipids, where appropriate cholesterol and 1 to 50 mol% of a compound as claimed in any of claims 1, 18 to 26 or salt thereof, where the cholesterol, the phospholipids, the alkylphospholipids and the compound together result in 100 mol% of the liposome shell constituents.

30. Liposomes as claimed in claim 29, which additionally comprise an active ingredient, where appropriate together with pharmaceutically acceptable diluents, excipients, carriers and fillers.

31. Liposomes as claimed in claim 30, wherein the active ingredient is a compound as claimed in any of claims 1, 14 to 17 and 27 to 28.

32. Liposomes as claimed in any of claims 29 to 31, which additionally comprise a nucleic acid.

33. A pharmaceutical composition, which comprises an active ingredient as claimed in any of claims 1, 14 to 17 and 27 to 29, where appropriate together with pharmaceutically acceptable diluents, excipients, carriers and fillers.

34. A process for preparing unsaturated (Z)-fatty acids or (Z)-alkenols corresponding to a radical as set forth in any of the formulae (VIII), (IX), (X) and (XI) having 16 to 34 carbon atoms, supplemented by the missing H, which comprises using as starting material a lactone of the formula (XIV):

(XIV)

where a = 10 to 16,

and which comprises the steps:

1) cleavage of the lactone ring with a trimethylsilyl halide to give the corresponding trimethylsilyl halo-carboxylate,

2) simultaneous or subsequent alcoholysis of the trimethylsilyl halo-carboxylate to give the corresponding halo-carboxylic ester,

3) reaction of the halo-carboxylic ester with triphenylphosphane to give the corresponding phosphonium salt,

4) reaction of the phosphonium salt with an aldehyde using a base and subsequent hydrolysis to give a corresponding (Z)-fatty acid salt,

5) liberation of the (Z)-fatty acid from the (Z)-fatty acid salt, and

6) where appropriate conversion of the (Z)-fatty acid into the corresponding (Z)-alkenol using lithium aluminum hydride.

35. The process as claimed in claim 34, wherein the (Z)-fatty acid is 15-(Z)-tetracosenoic acid, in which case cyclopentadecanolide is used as

starting lactone, and pelargonaldehyde is used as the aldehyde in step 4.

36. The use of a compound of the general formula (I) as claimed in any of claims 1 to 17, 27 and 28 as cytostatic active ingredient.

37. The use of a compound of the general formula (I) as claimed in any of claims 1 to 17, 27 and 28 as active ingredient against protozoal infections such as, for example, leishmaniosis and trypanosomiasis.

38. The use of a compound of the general formula (I) as claimed in any of claims 1 to 13 and 18 to 26 as liposome shell constituent.

39. The use of a compound of the general formula (I) as claimed in any of claims 1 to 13 and 22 to 26 as solubilizer for active ingredients insoluble in water.

40. The use of liposomes as claimed in claim 32 as gene transport vehicles.

41. The use of liposomes as claimed in claim 30 as antitumor compositions, where the active ingredient is doxorubicin.

42. The use of liposomes as claimed in claim 30 as compositions for influencing the proliferation of cells, where the active ingredient is a cytokine.

PTO/SB/01 (4-96)
Approved for use through 9/30/98 OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Type a plus sign (+) inside this box → [+]

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

☐ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing

Attorney Docket Number	HUBR 1177
First Named Inventor	Eibl, et al
COMPLETE IF KNOWN	
Application Number	
Filing Date	
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled :

Phospholipids with unsaturated alkyl and acyl chains

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) August 06, 1999 as United States Application Number or PCT International

Application Number PCT/EP99/05710 and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119 (a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365 (a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
198 35 611.0	Germany	Aug.06,98	☐	☐	☒
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority sheet attached hereto:

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	
		☐ Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (If applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: ☐ Customer Number 24972 → Place Customer Number Bar Code Label here

OR

☐ Registered practitioner(s) name/registration number listed below

Name	Registration Number	Name	Registration Number

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☐ Customer Number or Bar Code Label [ ] OR ☐ Correspondence address below

Name	Fulbright & Jaworski L.L.P.					
Address	666 Fifth Avenue					
Address	New York, N.Y. 10103					
City	New York	State	NY	ZIP	10103	
Country	USA	Telephone	001-212-3183000	Fax	001 -212-7525958	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])	Family Name or Surname
EIBL	Hansjörg

Inventor's Signature	[signature]					Date	17.01.2001
Residence: City	Bovenden-Eddigehausen	State	37120	Country	Germany	Citizenship	DE
Post Office Address	Heinrich-Deppe-Ring 22, 37120 Bovenden-Eddigehausen, Germany						
Post Office Address	same as above						
City		State		ZIP		Country	

☐ Additional inventors are being named on the ___ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

US

Type a plus sign (+) inside this box → ☐

DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor					
Given Name	Thomas	Middle Initial		Family Name	HOTTKOWITZ	Suffix e.g. Jr.	
Inventor's Signature					Date	27.01.2001	
Residence: City	Neustadt	State		Country	Germany	Citizenship	DE
Post Office Address	Kleingasse 8, 67435 Neustadt an der Weinstraße, Germany						
Post Office Address	same as above						
City		State		Zip		Country	

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor					
Given Name		Middle Initial		Family Name		Suffix e.g. Jr.	
Inventor's Signature					Date		
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		Zip		Country	

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor					
Given Name		Middle Initial		Family Name		Suffix e.g. Jr.	
Inventor's Signature					Date		
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		Zip		Country	

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor					
Given Name		Middle Initial		Family Name		Suffix e.g. Jr.	
Inventor's Signature					Date		
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		Zip		Country	

☐ Additional inventors are being named on supplemental sheet(s) attached hereto